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AND BUSINESS

Bank M&As in the U.S. and the EU: Shareholder value creation through consolidation

Emmanouil G. Pyrgiotakis

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Department of Accounting and Finance
Athens University of Economics and Business
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To my father, George E. Pyrgiotakis



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Περίληψη (Summary in Greek)

Η παρούσα διατριβή επικεντρώνεται σε μία λεπτομερή μελέτη των τραπεζικών συγχωνεύσεων και εξαγορών, και πιο συγκεκριμένα, στον τρόπο με τον οποίο οι κεφαλαιαγορές αντιδρούν στις ανακοινώσεις των συγχωνεύσεων αυτών. Απώτερος σκοπός της μελέτης είναι να εντοπίσει νέα ευρήματα στο χώρο των τραπεζικών συγχωνεύσεων, δεδομένων των δομικών αλλαγών του υπέστη ο τραπεζικός κλάδος τα τελευταία χρόνια. Όπως αναφέρει ο Kaplan (2000), οι απότομες αλλαγές στον τραπεζικό κλάδο και στην σχετική νομοθεσία δημιουργούν κύματα τραπεζικών συγχωνεύσεων. Ως εκ τούτου, η τρέχουσα οικονομική κατάσταση αποτελεί μια μοναδική ευκαιρία για την μελέτη του φαινομένου αυτού. Στην Αμερική, το νομοσχέδιο Dodd-Frank εφαρμόστηκε ως μια λύση για την κρίση του 2008 και άλλαξε το κανονιστικό πλαίσιο των τραπεζών, και στην Ευρώπη, η κρίση χρέους αποκάλυψε τις αδυναμίες των τραπεζικών συστημάτων των κρατών μελών. Και τα δύο γεγονότα είναι πιθανό να επέφεραν αλλαγές στον τρόπο που οι επενδυτές αντιδρούν στις ανακοινώσεις για επικείμενες συγχωνεύσεις στον τραπεζικό κλάδο. Ένα επίσης σημαντικό κομμάτι με το οποίο ασχολείται η παρούσα διατριβή είναι ένας βασικός περιορισμός των προηγούμενων σχετικών μελετών. Πιο συγκεκριμένα, όλες οι μελέτες έως τώρα χρησιμοποιούν δείγματα μεταξύ εισηγμένων τραπεζών. Παρόλα αυτά, στην βιβλιογραφία των μη τραπεζικών συγχωνεύσεων, υπάρχουν σαφείς ενδείξεις πως η εξαγορά μιας μη εισηγμένης εταιρίας έχει σημαντικά χρηματοοικονομικά οφέλη για τον αγοραστή (Fuller et al., 2002; Officer et al., 2009). Κατά συνέπεια, επιχειρούμε να καλύψουμε το βιβλιογραφικό αυτό κενό και να εξετάσουμε εάν η θετική επίδραση των μη εισηγμένων εταιριών στόχος ισχύει και στον τραπεζικό κλάδο.

Πριν αναφερθούμε στις επιμέρους μελέτες μας, θα ήταν σκόπιμο να παραθέσουμε μια λεπτομερή βιβλιογραφική ανασκόπηση, αναφορικά με το θέμα των τραπεζικών συγχωνεύσεων. Συνεπώς, στο δεύτερο κεφάλαιο της διατριβής αυτής, αναλύουμε εκτενώς τις σχετικές με το αντικείμενο μας μελέτες. Αρχικά, αναφερόμαστε σε θεωρητικό επίπεδο στα βασικά κίνητρα των τραπεζικών συγχωνεύσεων και εξαγορών, καθώς και στους οικονομικούς και άλλους παράγοντες που επηρεάζουν τις στρατηγικές εξαγορών των πιστωτικών ιδρυμάτων. Επιπροσθέτως, αναλύουμε τις νομοθετικές αλλαγές στον Αμερικάνικο και Ευρωπαϊκό κλάδο σε ξεχωριστή υποενότητα του κεφαλαίου αυτού, δεδομένης της σημασίας τους στον καθορισμό των επενδυτικών στρατηγικών των τραπεζών (Berger et al., 1999; Goddard et al., 2007). Τέλος, θα αναλύσουμε την μεθοδολογία μελέτης γεγονότος (event study) και τις κυριότερες σχετικές δημοσιευμένες έρευνες, καθότι είναι η βασική μεθοδολογία που χρησιμοποιούμε στις μελέτες μας για την αξιολόγηση των τραπεζικών συγχωνεύσεων.

Στην πρώτη μας μελέτη εξετάζουμε την επίδραση του νομοσχεδίου Dodd-Frank στις Αμερικάνικες τραπεζικές συγχωνεύσεις. Αρχικά, βρίσκουμε πως τα κόστη συμμόρφωσης με το νέο νομοσχέδιο καθώς και οι νέοι περιορισμοί δημιούργησαν μια νέα τάση συγχωνεύσεων μεταξύ μικρών τραπεζών. Στην πραγματικότητα, οι μικρές τράπεζες συγχωνεύονται με έντονο ρυθμό, μιας και η αύξηση του μεγέθους τους βοηθάει στο να απορροφούν γρηγορότερα τα κόστη συμμόρφωσης. Βάσει των κανονιστικών πλαισίων του νομοσχεδίου, το ανώτατο σημείο για βέλτιστες συγχωνεύσεις μεταξύ μικρών τραπεζών θα είναι τα \$10 δισεκατομμύρια σε αξία στοιχείων ενεργητικού, δεδομένου ότι οι τράπεζες που δεν υπερβαίνουν αυτό το όριο εξαιρούνται από τους περισσότερους περιορισμούς. Πιο συγκεκριμένα, τα ιδρύματα που ξεπερνούν τα \$10 και \$50 δισεκατομμύρια σε στοιχεία ενεργητικού, υπόκεινται

σε αυστηρότερους ελέγχους κεφαλαιακής επάρκειας και ρευστότητας, καθώς και σε περιορισμούς αναφορικά με τις χρεώσεις των καρτών που εκδίδουν και με την θέση τους σε επενδυτικά σχήματα. Αντιθέτως, οι μικρές τράπεζες απολαμβάνουν ένα είδος “ασυλίας” από αυτούς τους περιορισμούς και την εκτενή εποπτεία, σε μια προσπάθεια των νομοθετών να αυξήσουν την ανταγωνιστικότητα των μικρών πιστωτικών ιδρυμάτων στην Αμερικάνικη αγορά. Συνεπώς, η βασική υπόθεση της μελέτης είναι πως οι συγχωνεύσεις μικρών τραπεζικών ιδρυμάτων είναι επωφελείς μετά το πέρας του νομοσχεδίου για δύο λόγους: (1) επιτρέπουν στα συγχωνευθέντα ιδρύματα να απορροφήσουν τα κόστη συμμόρφωσης με ταχύτερο ρυθμό, δημιουργώντας οικονομίες κλίμακας, και παράλληλα (2) δεν υποχρεούνται να εφαρμόσουν επιπλέον νομοθετικό πλαίσιο εν αντιθέσει με τις μεγάλες τράπεζες.

Χρησιμοποιώντας ένα δείγμα 640 συγχωνεύσεων από το 1990 έως το 2014, βρίσκουμε πως μετά την εφαρμογή του νομοσχεδίου, οι συγχωνεύσεις μικρών τραπεζών (που το σύνολο το ενεργητικού τους δεν ξεπερνά αθροιστικά τα \$10 δισεκατομμύρια), δημιουργούν σημαντικά μεγαλύτερη αξία στους μετόχους συγκριτικά με τα προηγούμενα χρόνια. Είναι αξιοσημείωτο, πως αυτή η στατιστικά σημαντική διαφορά παραμένει ακόμα και αν ελέγξουμε την πιθανή επίδραση του μεγέθους των εταιριών, του γεωγραφικού προσδιορισμού της συγχώνευσης, ή του τρόπου πληρωμής. Επιπροσθέτως, από την ανάλυση της παλινδρόμησης προκύπτει πως η μετοχική αξία αυτή αυξάνει όσο αυξάνουν και οι προοπτικές για μεγαλύτερες μειώσεις στα κόστη συμμόρφωσης με το νομοσχέδιο.

Στην δεύτερη μας έρευνα επιχειρούμε να επεκτείνουμε την υπάρχουσα βιβλιογραφία εξετάζοντας εξαγορές εισηγμένων και μη εισηγμένων εταιριών από εισηγμένες Αμερικάνικες τράπεζες. Οι σχετικές μελέτες για τις συγχωνεύσεις μη τραπεζικών ιδρυμάτων καταδεικνύουν πως οι εταιρίες που εξαγοράζουν μη εισηγμένες εταιρίες

στόχους απολαμβάνουν θετικές υπερβάλλουσες αποδόσεις στην ανακοίνωση των εξαγορών αυτών. Επιπροσθέτως, οι έρευνες αυτές αποδίδουν την θετική απόκριση της αγοράς στην αβεβαιότητα που ενέχει η εξαγορά μιας μη εισηγμένης εταιρίας. Έχοντας συνεπώς υπόψη πως ο τραπεζικός κλάδος είναι ένας κλάδος με μεγάλη δυσκολία στην αποτίμηση των στοιχείων του ενεργητικού, καθώς και της λεγόμενης “σκιώδους τραπεζικής αγοράς”, αναμένουμε πως η εξαγορά ενός μη εισηγμένου χρηματοπιστωτικού ιδρύματος θα ενέχει ακόμα μεγαλύτερη αβεβαιότητα. Ακολουθώς, περιμένουμε να βρούμε θετικές υπερβάλλουσες αποδόσεις στις ανακοινώσεις των εξαγορών αυτών.

Για τον σκοπό αυτό, χρησιμοποιούμε ένα δείγμα της τάξεως των 2.178 συγχωνεύσεων από το 1984 έως το 2015. Τα αποτελέσματα μας δείχνουν, εν αντιθέσει με ότι έχει αναφερθεί έως τώρα, πως οι τράπεζες που αγοράζουν μη εισηγμένες εταιρίες απολαμβάνουν θετικές υπερβάλλουσες αποδόσεις στις ανακοινώσεις των εξαγορών αυτών. Είναι επίσης άξιο αναφοράς πως οι υπερβάλλουσες αυτές αποδόσεις δεν εξαρτώνται από συνήθεις παράγοντες όπως ο τρόπος πληρωμής, οι νομοθετικές αλλαγές, ο γεωγραφικός προσδιορισμός της εξαγοράς, και το μέγεθος των εταιριών. Σε μια προσπάθεια να αναλύσουμε την αιτία του φαινομένου αυτού, εξετάζουμε το ρόλο των χρηματοοικονομικών συμβούλων στον καθορισμό των αποδόσεων. Οι χρηματοοικονομικοί σύμβουλοι παρέχουν υψίστης σημασίας υπηρεσίες στην περίπτωση των εξαγορών μη εισηγμένων εταιριών, δεδομένου πως οι μη εισηγμένες εταιρίες δεν παρέχουν πληροφορίες για την οικονομική τους κατάσταση στο ευρύ κοινό. Ακολουθώς, βρίσκουμε πως όταν οι τράπεζες δεν χρησιμοποιούν συμβούλους σε τέτοιες εξαγορές, οι υπερβάλλουσες αποδόσεις τους είναι αρνητικές, και συγκρίσιμες με αυτές των εξαγορών εισηγμένων

εταιριών. Στην περίπτωση όμως που χρησιμοποιούν τέτοιες υπηρεσίες, τότε επιτυγχάνουν υψηλές υπερβάλλουσες αποδόσεις.

Στην τρίτη και τελευταία μελέτη εξετάζουμε την πιθανή επίδραση της Ευρωπαϊκής κρίσης χρέους στην τραπεζικές συγχωνεύσεις των κρατών μελών της Ένωσης. Υποθέτουμε πως σε ένα περιβάλλον οικονομικής δυσπραγίας η ικανότητα κάποιων τραπεζών να εξαγοράζουν άλλα ιδρύματα θα μεταφράζεται σαν σημάδι καλής οικονομικής κατάστασης. Πιο συγκεκριμένα, σε ένα τραπεζικό κλάδο που αντιμετωπίζει έλλειψη ρευστότητας και κερδοφορίας λόγω της έκθεσης σε κόκκινα δάνεια και κρατικά ομόλογα, η ικανότητα επέκτασης μέσω εξαγορών μπορεί να υπονοεί οικονομική ευρωστία. Ως εκ τούτου, αναλύουμε ένα δείγμα 522 τραπεζικών συγχωνεύσεων από το 1990 ως το 2016 για να δούμε εάν η κρίση επέφερε αλλαγές στον τρόπο που οι επενδυτές αντιδρούν στις ανακοινώσεις των επικείμενων συγχωνεύσεων. Τα εμπειρικά αποτελέσματα δείχνουν, πως οι τράπεζες που ανακοίνωσαν κάποια εξαγορά από το 2009 και μετά, κερδίζουν 2% μεγαλύτερες υπερβάλλουσες αποδόσεις συγκριτικά με τα προηγούμενα χρόνια. Η απόδοση αυτή μεταφράζεται σε μια υπερβάλλουσα απόδοση της τάξης των \$34 εκατομμυρίων για την μέση εξαγοράζουσα τράπεζα. Αντίστοιχα, στα προ-κρίσης χρόνια, η μέση τράπεζα έχανε περίπου \$22 εκατομμύρια σε κάθε ανακοίνωση εξαγοράς. Επιπροσθέτως, η εμπειρική ανάλυση μέσω παλινδρομήσεων καταλήγει σε χρήσιμα συμπεράσματα. Πιο συγκεκριμένα, κατά την διάρκεια της κρίσης, οι υπερβάλλουσες αποδόσεις είναι μεγαλύτερες όταν οι εξαγοράζουσες τράπεζες είναι πιο αποδοτικές, έχουν λιγότερα κόκκινα δάνεια στα χαρτοφυλάκια τους, και επεκτείνονται σε αδύναμες χώρες τις περιφέρειες του ευρώ.

Abstract

In this thesis, we focus on providing new evidence regarding the shareholder wealth effects on bank M&As. As Kaplan (2000) suggests, merging activity is influenced by industry and regulatory shocks. Therefore, the current economic condition provides a unique opportunity for examining potential changes in consolidation trends in the banking industry. On the one hand, the Dodd-Frank Act in the U.S. attempts to re-regulate the financial sector after the market collapse of 2008, and on the other hand, the long-lasting European sovereign debt crisis had revealed the weaknesses of the European banking industry. Therefore, both events are likely to have influenced the way market participants react to bank mergers and acquisitions. Another important issue is the limitation in samples of the existing relevant studies. All studies for the U.S. market focus exclusively in deals between publicly-traded banks, and find no evidence of merger-related bidder gains. Fuller et al., (2002), Officer et al. (2009), among others, examine deals between nonfinancial firms, and find positive bidder gains in private offers. Hence, we attempt to fill this gap and examine whether this “listing-effect” is also evident in the banking industry.

The first objective of this research is to analyze the influence of the Dodd-Frank Act in the U.S. bank mergers. We find that the new regulatory compliance costs and heavy-handed regulation of certain activities have shaped a new consolidation trend at the low-end of the asset-size distribution. 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 employ a sample of 640 M&As from 1990 to 2014, and we find that small bank mergers



create more value after the Act's enactment due to a 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.

The second objective of this thesis is to extend the U.S. bank M&As literature by examining announcement returns for acquisitions of both listed and unlisted targets by U.S. banking firms. Contrary to the conventional wisdom that bidding banks lose upon the announcement of a merger, we find positive abnormal returns for these firms that choose to acquire privately-held targets. Further, returns for acquirers in private offers do not depend on the method of payment, legislative changes, size, or geographical scope. However, we find that the use of a financial advisor on the part of the bidder can better explain the variation in abnormal returns for such offers. Our results are not influenced by any unobserved bidder-specific component or sample selection issues.

The third objective of this study is to examine whether the European sovereign debt crisis has impacted consolidation in the EU banking industry. We propose that in such a economic distressed environment, financially healthy banks may choose to increase their market power via M&As. Following this argument, we retrieve a sample of European bank M&As over the period 1990 to 2016, and we examine whether the ongoing financial crisis has any impact on the way market participants react to these transactions. Our findings for the post-2008 period contrast the consensus view that bidding banks lose at the announcement of a merger. In fact, bidders experience approximately 2% higher abnormal returns during the crisis than before. Shareholders of the average bidding firm now gain approximately \$34 million at the announcement, a \$56 million gain improvement compared to the pre-crisis period. Our cross-sectional results indicate that these crisis-related merger gains are



higher for more efficient banks with lower NPLs ratios, and for those banks that expand in weak Eurozone countries.

Chapter 1

Introduction

It is a well-known fact in the corporate finance literature that mergers and acquisitions (M&As) come in waves (Martynova and Renneboog, 2008). The global financial sector was no exemption from this rule, given that the banking industry underwent dramatic consolidation in many phases since the 1980s. In the U.S., the deregulation practices of the 1990s fueled merging activity among banks in an unprecedented magnitude (Becher, 2000; Berger and DeYoung, 2001). Similarly, the European Monetary Union (EMU), and the introduction of the euro have spurred banking consolidation in the other side of the Atlantic Ocean (Ekkayokkaya et al., 2009). However, in the recent years, the global banking industry has been hit with two interconnected seismic shocks: first, the financial crisis of 2008, and second, the European sovereign debt crisis. These major events resulted in remarkable changes in the banking structure of the U.S. and the EU. To date, we are not fully aware of the consequences of these two crises on bank M&As. However, anecdotal evidence suggests that U.S. banks merge at a rapid pace since 2010, while European authorities call for cross-border bank mergers as the solution for the low-profitability levels of the crisis period. Motivated by these facts, we dedicate a significant part of our research to shed light on these issues.

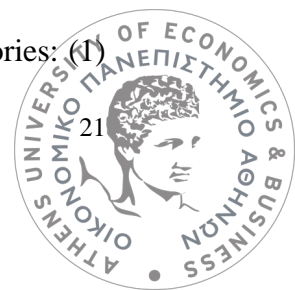
The ironic fact about bank M&As is that most of the relevant studies fail to find conclusive evidence on whether these deals are value-creating for the acquiring firms' shareholders, or not. In general, the prevailing view is that European bidders perform significantly better than their U.S. counterparts (Hagendorff et al., 2008; DeYoung et al., 2009). Even in this case though, European bidders realize negligible or economically trivial abnormal returns when they announce a merger (Tourani-Rad and Van Beek, 1999; Cybo-Ottone and Murgia, 2000). However, several studies have managed to find positive bidder gains only in domestic and product-diversified



deals (Beitel et al., 2004; Lepetit et al., 2004) In the U.S., bidding banks lose upon the announcement of the merger, targets gain, and on average both firms breakeven (DeLong and DeYoung, 2007). This finding suggests a bidder-to-target redistribution of wealth. Only a handful of studies document positive merger-related gains in the U.S. banking industry (Houston et al., 2001; Becher, 2009; Filson and Olfatti, 2014). The common ground in all these studies is the benefits of deregulation in the market for corporate control. Inevitably, all these findings raise important questions: Why do bank managers continue to engage in M&As? Are there any chances for shareholder wealth creation in bank M&As? Hence, in this thesis, we are also interested in finding answers for the aforementioned questions.

Before we move on to our research papers, we provide a brief overview of the relevant literature in Chapter 2. In this chapter, we discuss the motives behind bank mergers and acquisitions, and the main drivers of banking consolidation trends. Considering that regulations have a substantial impact on acquisition behavior in the banking industry, we also outline the key legislative changes in the U.S. and the EU. Moreover, we describe in detail the basic methodology we utilize in all our research papers, namely the event study methodology. Finally, we identify and summarize the most cited studies in this field.

Chapter 3 focuses on the U.S. banking industry, and particularly, in the M&As trends after the passage of the Dodd-Frank Act (DFA) in 2010. The Dodd-Frank Act is a massive piece of federal regulation (2,319 pages) that came as a response to the financial crisis of 2008. This new financial reform attempts to re-regulate the industry, and includes several activity-based restrictions, particularly for larger institutions. By carefully examining the Act's provisions, we identified that under the new regulatory regime, banks are classified into three main asset-size categories: (1)



small (banks with assets below \$10 billion), (2) medium-sized (banks with assets between \$10 and \$50 billion, and (3) large (banks with assets of more than \$50 billion). Interestingly, the DFA regulatory compliance costs and the activity-based restrictions are distributed differently across these three categories. Compliance costs are more burdensome to small banks, since these institutions lack the capacity of absorbing the new regulations at a faster pace, while activity-based restrictions are subject only to medium-sized and large banks. Given these major structural changes in the U.S. banking industry, we attempt to find whether the Act had any impact on the way market participants respond to bank M&As announcements. To the best of our knowledge, our paper is the first that examines this issue under the investors' perspective.

Several scholars have suggested that the new regulatory reform may impact consolidation among banks. Aiello and Talbert (2010) and March (2015) argue that the DFA will encourage 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. On the contrary, medium-sized and large institutions have no real motive to engage in an M&As, since any cost savings for regulatory compliance may not offset the increased burden of activity-based restrictions. Following this argument, we empirically examine whether investors react differently to M&As in these asset-size categories after the DFA's passage.

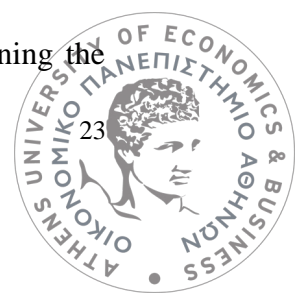
To address our research question we retrieve a sample of 640 completed U.S. M&As, announced between 1990 and 2014. We employ the Difference-in-Differences



methodology, and we find that bidder and combined firms' abnormal returns in small bank M&As are significantly higher after the passage of the Act, while medium-sized and large bank mergers destroy value. Further, our multivariate regressions suggest that gains in small bank M&As relate to the potential for compliance cost savings. For robustness, we repeat the same analysis for a comparable sample in the EU, and we don't find similar results. As such, we conclude that the DFA has indeed altered the investors' perception towards small bank mergers, and we also suggest that the \$10 billion mark may serve as the rooftop for value-creating acquisitions in the post-DFA era.

In Chapter 4 we examine the role of the target firm's listing status in explaining bidder announcement period gains. Strikingly, all the U.S. bank M&As studies focus exclusively to mergers between publicly-traded banks. In the nonfinancial sector, there is a growing literature that outlines the benefits of acquiring private targets (Chang, 1998; Fuller et al., 2002; Faccio et al., 2006; Officer et al., 2009; Netter et al., 2011). All these studies suggest that the uncertainty regarding the valuation of an unlisted target firm may account for the significantly higher abnormal returns in private offers. Considering the increased opacity of the banking industry, it is also quite likely to find opportunities of shareholder value creation in acquisitions of unlisted financial firms.

To test our prediction, we obtain a sample of 2,178 acquisitions by U.S. banks from 1984 to 2015. We find that bidders of privately-own targets consistently outperform bidders of public firms. In fact, after controlling for factors such as the method of payment, regulatory passages, firm size, etc, bidders in private offers experience approximately 2% higher abnormal returns than bidders in public offers. Moving a step forward, we also examine the role of the financial advisors in explaining the



difference in market reaction between private and public offers. Financial advisors, with their expertise in information collecting and processing, are capable of resolving uncertainties regarding the target firm's valuation. Given the wide availability of information for public firms, it is likely that the use of financial advisor on the part of the bidder may be more valuable in private offers. Consequently, we find that in private offers, bidders who employ financial advisors realize abnormal returns in the order of 1.47%, while bidders that did not use financial advisory services experience a drop in their stock price. In public offers, bidders realize negative announcement period returns in both cases. Therefore, the concluding remark of this study is that shareholder value-creation is feasible in U.S. bank M&As. Banks that acquire private targets and employ financial advisors to resolve information asymmetries realize significant merger-related gains. More importantly, this finding is robust to any other potential determinants of bidder returns, such as size, geographical scope, regulatory changes, and method of payment.

Finally, in Chapter 5, we shift our attention from the U.S. to the EU banking industry. More specially, we are interested on whether the long-lasting European sovereign debt crisis had any effect on bidder gains. In 2009, the member states of the European Union entered into recession (Claessens et al., 2010). During this crisis, many EU banks realized solvency issues, and experienced severe drops in their stock prices (Betz et al., 2014; Chan-Lau et al., 2015). In this financial distressed environment, it is likely that financially healthy acquisitions may exert their dominant position in the market and acquire problematic firms in beneficial terms (Acharya et al., 2011). If this argument is valid, we expect to find a positive crisis effect on the way market participants react to such acquisitions.



We test empirically this prediction by estimating announcement abnormal returns for acquiring firms in a sample of 522 EU M&As, announced between 1990 and 2016. Our univariate approach indicates that bidding banks realize positive and significant gains during the sovereign crisis in the order of 2%, while abnormal returns for the pre-crisis period are marginally negative. In monetary terms, the average bidding bank creates \$34 million in shareholder value in M&As, a \$56 million improvement compared to the pre-crisis period. We further document that this finding is robust to the several phases of the European crisis, as well as to common determinant of bidder gains such as geographic and product diversification. Results of the cross-sectional analyses suggest that bidder gains increase with the financial condition of the bidding firm, as measured by efficiency and the NPLs ratio. Finally, banks that expand in problematic EU periphery countries realize even higher announcement period gains.

So far, the only study that examines the issue of EU bank M&As in the crisis period is the one of Beltratti and Paladino (2013). The authors find zero abnormal returns at the announcement date and positive at the merger completion date. They attribute this finding to the increased uncertainty regarding the materialization of a proposed merger during the crisis period. Therefore, for robustness, we also considered this possibility. By examining abnormal returns at the completion date, we find higher market reaction around these events since 2009. However, by examining the probabilities of acquisitions success, we found that bidding banks are more likely to complete an acquisition during the European sovereign debt crisis period. Hence, to explain the variation in bidder completion CARs we follow a different approach. In univariate and multivariate tests, we document a strong positive relationship between announcement and completion CARs. In fact, when we account for this relationship,

the crisis does not have any significant effect on bidder completion CARs. We therefore suggest that when market participants view acquisitions at the announcement as value-creating, they might also do at the completion date. Consequently, given that announcement CARs are significantly higher during the crisis than before, it is well justified why completion CARs also increase since 2009.

Overall, all of our research papers aim to identify shareholder value emanating from bank M&As. Our evidence suggests that in certain cases, bank mergers could be value-creating investments for the acquiring firms' shareholders. We also examined the new trends in the M&As market after the financial crisis of 2008 and the European sovereign debt crisis. In summary, we document that acquisition activity has rebounded after the initial shock of these two crises, but the motives behind these acquisitions are now different.

The remainder of this thesis is structured as follows. Chapter 2 provides a comprehensive review of the relevant literature. Chapters 3, 4, and 5 present the three research papers. Chapter 6 concludes the thesis.



Chapter 2

Literature Review



2.1. Introduction

Mergers and acquisitions (M&As) are a quite common phenomenon in the global financial industry (DeYoung et al., 2009). In fact, during the previous decades, the industry experienced massive consolidation. As a consequence, the number of firms in the financial sector has significantly declined, and the typical surviving firm is larger, more diversified, and operates in various regions. As Amel et al. (2004) describe, more than 10,000 financial firms were acquired in the major developed economies during the period 1990-2001. The U.S. market constitutes the most prominent example of consolidation in the banking industry. Between 1984 and 2017, the total number of banks operating in the U.S. fell from 14,400 to 4,888.¹ Interestingly, the European financial services market followed a parallel direction. According to Goddard et al. (2007), the number of banks in the EU15 countries has declined from 12,315 to 7,300 from 1984 to 2004. This figure was further declined to approximately 5,000 by the end of 2017.²

In this thesis, we will focus primarily on the U.S. and the EU banking industries, since they are the most active markets in terms of M&As. As Kolaric and Schiereck (2014) suggest, the aggregate transaction value of bank M&As in the U.S. was about \$375 billion between 2000 and 2010, and more than \$330 billion for the European market. Intrigued by these figures, we are particularly interested in examining the reasons behind this intense merging activity among banks, as well as the potential sources of value creation emanating by these transactions.

Apparently, this intense consolidation trend in the financial services industry has motivated several authors to examine the reasons and the implications behind this

¹ Source: <https://fred.stlouisfed.org/series/USNUM>

² Source: <https://www.ecb.europa.eu/pub/pdf/other/reportonfinancialstructures201710.en.pdf>.



phenomenon. A handful of review studies suggest that the bank merger activity is a direct result of financial innovations (Berger et al., 1999; Amel et al., 2004). Berger (2003) outlines the importance of technology in determining consolidation among financial firms. Kaplan (2000) argues that mergers are associated with industry or regulatory shocks. In the next part of this chapter, we will briefly discuss all the theories that explain the acquisition behavior of banking firms.

The remainder of this chapter is organized into four sections. Section 1 reviews the various motivations behind bank mergers. Section 2 outlines the main drivers of acquisition behavior in the banking industry. Section 3 describes the regulatory changes in the U.S. and the EU banking industries. Section 4 presents the event study methodology, and summarizes much of the relevant empirical literature for the U.S. and the EU.

2.2. Motives for Merger and Acquisitions

Banks merge for a variety of reasons. However, the motivation behind a proposed merger is associated with what the market believes for this project. Miller and Modigliani (1961) state that the motivation behind M&As is the maximization of shareholder wealth. In this case, the market should always react positively to the announcement of a proposed merger. However, as we often see in the literature, acquiring firms lose upon the announcement of the merger. This phenomenon implies that M&As may also occur for non-value-creating reasons. Therefore, in line with Berger et al. (1999), we classify the motives for bank M&As into: (1) value maximizing motives, and (2) non-value maximizing motives.

2.2.1. Value maximizing motives

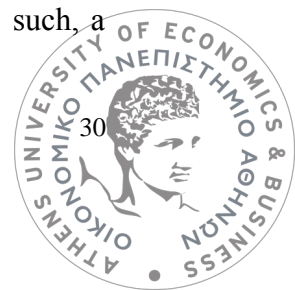
Theoretically speaking, the main motivation between acquisitions is to maximize shareholder value. Value maximizing motives explain why the bidding firm's stock price increases at the announcement of the merger. Value could be maximized primarily due to merger-related synergies or diversification strategies.

2.2.1.1. Synergetic motives

Synergy is probably the most widely-stated reason behind M&As. When two different entities merge, they can operate more efficiently by lowering their costs or increasing their profit margins. DePamphilis (2008) classifies the merger-related synergies into two main categories: (1) operating synergy and (2) financial synergy.

Operating synergy can be materialized in two ways: (1) economies of scale and (2) economies of scope. Economies of scale refer to the firm's ability to lower its costs by spreading the fixed costs over a larger output. In the banking industry, economies of scale may be realized for example when a bank acquires credit risk information for a bigger sample of borrowers, by using the same input. By doing so, the bank lowers its costs of obtaining the necessary information to perform its lending activities. Economies of scope are realized when an institution utilizes an existing skill to produce a new set of products. Based on the previous example, as a bank uses its human capital to evaluate its customers' credibility, it can also use the same resources to evaluate large corporate loans.

Financial synergy refers to the cost of capital of financial institutions. A merger may reduce the cost of capital of the acquiring firm in many ways. Firstly, by combining firms with uncorrelated cash flows, we can reduce the volatility of the combined firm's stock price and achieve lower expected returns for the investors. As such, a

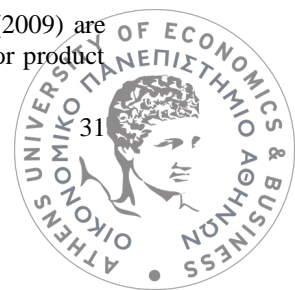


merger between a high growth institution with a firm that produce larger and more stable cash flows, could result in decreased cost of borrowing. Secondly, it is possible that the acquiring firm may exploit a possible low debt-to-equity ratio of the target and expand its lending capacity. Lastly, a merger can provide unused opportunities for tax shields. More often than not, target firms realize losses before the acquisition. The acquiring firm can use these losses to show lower taxable income and pay fewer taxes. An additional opportunity for tax shields emanates during due diligence process, where the assets of the target firm are re-evaluated. In case of a write-up, which is an increase of the asset value, the difference is stored as goodwill and its amortization is tax exempt.

2.2.1.2. Diversification motives

Diversification is a frequently-used term in the finance literature and it generally refers to risk reduction by combining negatively-correlated securities. In M&As literature, we observe two main sources of diversification: (1) geographic diversification, and (2) activity diversification. Geographic diversification refers to cross-border mergers. These acquisition strategies often aim to higher growth markets if the bidding firm's domestic market is already mature. An example of activity-diversified deal is a merger between a commercial bank and an insurance company. In the U.S. financial sector, product diversification strategies were quite popular in the late 90's, and in the early 2000s. However, empirical literature does not provide conclusive evidence on whether diversification strategies are value-creating, or not. Empirical evidence in some studies is supportive of diversification whereas in others is not.³

³ Houston and Ryngaert (1994), Houston et al. (2001), Cornett et al. (2006), and Correa (2009) are examples of studies that quantify the wealth and performance effects of geographical and/or product diversification.



2.2.2. Non-value maximizing motives

Non-value maximizing motives explain why, in many occasions, the bidding firm's stock price decline at the announcement of the merger. In almost all cases, this negative market reaction relates to managerial issues. In the remaining part of this section we will briefly discuss all this value-destroying motives for acquiring firms.

2.2.2.1. *Hubris hypothesis*

Hubris hypothesis or the 'overpayment hypothesis' refers to the fact that managers usually believe that they are better able to assess the value of a firm than the market.⁴ Consequently, they think that the potential target bank is undervalued. Inevitably, their overconfidence about their valuation abilities often results in paying higher-than-expected premiums for the target bank.

One relevant theory is the winner's curse. In a competitive market for corporate control, many firms are placing bids for the same target. This increase in competition often leads to higher premiums. In this case, it is likely that the winner of the bidding war is cursed to pay more than the target deserves. The winner's curse is often attributed to the unwillingness of the managers to lose the bidding war. Apparently, such mergers destroy value for their shareholders.

2.2.2.2. *Empire building hypothesis*

There are several reasons why bank CEOs may be willing to engage in an acquisition and increase their firm size. At first, managers of large firms usually enjoy a "quiet life", due to the absence of competition with other rivals. Building a personal empire is a common motive behind acquisitions. Bank managers often fear that their firm might become a possible target and they will end up losing their jobs. Hence, by

⁴ Roll (1986) developed this hypothesis in his relevant study.



increasing their firm's size, they are able to protect their position from a potential takeover, since larger firms are more expensive for the potential bidders.⁵

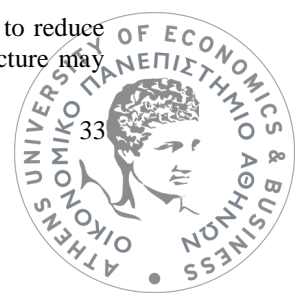
Secondly, managers are more likely to engage in a merger if their compensation is linked to the size of the firm (DeYoung et al., 2009). In this case, their utility maximization motives may outweigh the potential consequences for their firm. In fact, Bliss et al. (2000) show that mergers have a positive effect on CEO compensation even if the merger destroys value for the firm's shareholders. Accordingly, they show that equity-based compensation reduces the likelihood of a merger, given that the stock price of the acquiring firm usually declines at the announcement of such deals. Additionally, Rosen (2005) finds that when CEOs expect larger size-related compensations, they tend to get involved in extensive takeover programs.

2.2.2.3. Too big to fail doctrine

Too-big-to-fail (TBTF) financial institutions became a major issue for discussion among regulations since the financial crisis of 2007-2009. In the wake of this crisis, large systemically important institutions realized major losses causing a tremendous hit to the stability of the global financial system.

Why this TBTF status can be a motivation that drives mergers and acquisitions? Avgouleas (2010) suggests that large banks enjoy a variety of privileges compared to their smaller rivals. The managers of these large systemically important institutions are inclined to add more risky assets in their banks' portfolios, due to the fact that in the event of a bankruptcy, the government will use public funds for a bailout. DeYoung et al. (2009) argue that the largest U.S. banks were benefited from the

⁵ Managers may also try to protect their human capital, engaging in a diversifying merger to reduce the insolvency risk of the firm. Empirical findings suggest that problematic corporate structure may lead to the conflicts of interest between managers and shareholders. See Berger et al. (1999).



TBTF status because they had lower cost of funding and they were able to operate with lower capitalization rates. Furthermore, Morgan and Stiroh (2005) found out that after a bank is considered TBTF, then its bond ratings are upgraded and they are less prone to changes. So, even if the fundamentals of the financial institution suggest that its credibility should be downgraded, the TBTF status reduces the possibility of a downgrade. In fact, the TBTF status reflects a general optimism that in case that something goes wrong, a government bailout will transfer the risk from the financial institutions to the taxpayers. Therefore, it is well-justified why large banks may be tempted to engage in M&As as to achieve the TBTF status (Brewer and Jagtiani, 2013).

In summary, all these non-value maximization hypotheses are associated with the agency problems inside the firm. The agency problems specify the differences that occur when the personal interests of the managers are not in line with the interests of the firm's shareholders.

2.3. Drivers of consolidation in the financial industry

The drivers of bank M&As are those forces that enabled excessive consolidation throughout the banking industry. There is a general agreement in the literature for the classification of these forces. For the U.S. market, Houston and Ryngaert (1994), Becher (2000), Becher and Campell (2005), among others, outline the importance of deregulation in determining the consolidation activity in the banking industry. In addition, Ismail and Davidson (2005) state that the main drivers of the EU bank merger wave were: the financial deregulation, international integration, demographics, information technology, entry of new competitors and the Euro. Accordingly, Campa and Hernando (2006) also suggest that deregulation, competition, technological progress, and the Euro had a major role in reshaping the

banking industry in the EU All these factors impact consolidation in a different way. For this reason, we describe each one of them separately.

2.3.1. Information technology

Technology creates new products and markets. In the financial sector, examples of technological innovations were the credit cards, web banking, ATMs etc.⁶ It is therefore likely that banks may engage in M&As in order to adjust with all these changes. Dermine (2000) reports that information technology (IT) fuels takeover activity in three ways: (1) the speed that the data can be transferred throughout the globe, (2) the ability to process and manipulate a greater amount of data than before, (3) and the ability to reach new customers by using new delivery channels.

2.3.2. Financial deregulation

The banking industry is accustomed to legislative waves. In the past decades, a deregulation wave hit the major economies of the world, setting new standards in M&As. The European countries abandoned several restrictions from the early 1980s, such as limits on credit growth and access to the money markets. Accordingly, in the U.S., successive legislative changes removed all the barriers for consolidation in the 1990s. In a next part of our analysis we will briefly discuss all these changes that impacted merging activity in the U.S. and the EU.

2.3.3. International integration

Deregulation of the financial sector came along with the globalization trend. In the 1990s, developed economies signed several agreements in an effort to facilitate the free trade of goods and services. In 1995, the members of the World Trade Organization (WTO) signed the General Agreement on Trade in Services (GATS).

⁶ See also Radecki et al. (1997)



Its main objective was to remove the barrier of free-trade between the country members. In this period, the North American Free Trade Agreement (NAFTA) was also signed, setting the trading rules between the U.S., Canada and Mexico. Under NAFTA, an American or Mexican bank could establish a subsidiary in the Canadian market. As a consequence, this global environment promoted the cross-border expansion via M&As.

2.3.4. Increased competition

Increased competition is associated with merging activity, since banks want to retain their position in the market (James and Wier, 1987). In the developed economies, thousands of banks compete for their share in the market. It is also worth-mentioning, in this globalized environment, not only banks compete in the financial sector. Industrial firms and supermarkets have entered the finance area by issuing credit cards through their financial subsidiaries. Commercial banks thus often resort to mergers and acquisitions in an attempt outperform their rivals or to reduce potential harm by the new entrants.

2.4. Regulatory changes in the U.S. and the EU

In this section, we will briefly discuss the regulatory environment of the U.S. and the EU banking industries. Given that regulatory changes are paramount in explaining the M&As activity, we document the legislation that had a likely impact on bank consolidation trends.

2.4.1. United States

Table 2.1 depicts the most important legislative changes that had a major impact on U.S. banks. Apparently, the U.S. banking industry has experienced drastic changes throughout the last century. In fact, the strict regulatory passages after the Great



Table 2.1

Summary of key legislative changes in the U.S.

1927	The McFadden Act. Prohibits interstate branching. Banks are allowed to expand only in their home state.
1933	The Glass- Steagal Act. Prohibits commercial banks from engaging in trading activities.
1933	The Banking Act. Establishment of the Federal Insurance Deposit Corporation (FDIC).
1956	The Bank Holding Company Act. The establishment of the regulatory and supervisory environment for bank holding companies.
1989	The Financial Institutions Reform, Recovery and Enforcement Act (FIRREA). Reform of the FDIC. Strengthening supervisory powers of federal regulators. Allowed BHCs to acquire thrifts.
1994	The Riegle-Neal Act. Amended the McFadden Act of 1927 by allowing banks to operate and expand interstate.
1999	The Gramm-Leach-Bliley Act. Amended the Glass-Steagal Act of 1933 by allowing commercial banks to engage in nonbanking activities.
2002	The Sarbanes-Oxley Act. Increased disclosure standards for all U.S. public firms.
2010	The Dodd-Frank Act. Attempts to re-regulate the banking industry. Increased capital, liquidity, and prudential standards.

Depression resulted in an overpopulated banking industry. Interestingly, by 1998, only 15% of the world's 1,000 largest banks were located in the United States. This industry structure remained unchanged until the 1990s, where the deregulation wave fuelled consolidation among U.S. banks. (Becher, 2000; Becher and Campell, 2005; Becher, 2009; Filson and Olfati, 2014). In the aftermath of the global financial crisis of 2007-2009 however, federal regulators have called for a re-regulation of the banking industry. Therefore, the Obama administration signed the Dodd-Frank Act, on July 21, 2010, in an effort to address the TBTF problem and prevent future bailouts. Several scholars and academics have questioned the effectiveness of the Act in achieving its core objectives (Whitehead, 2011; Skeel, 2011; Wilmarth, 2011), while Leledakis and Pyrgiotakis (2016) suggest that the Act has produced a new wave of bank M&As.



2.4.2. Europe

European bank M&As are also a heavily-examined issue in the corporate finance literature.⁷ EU is a quite interesting market to investigate given that it consists of several different economies with diverse characteristics in their banking industries. Historically, the regulatory framework in EU was less restricting compared to the U.S. For example, commercial banks in Germany and in France were allowed to engage in both commercial and investment activities long before the U.S. deregulation wave.

The structural features of the European banking industry have changed significantly the past decades (Molyneux, 2007). All these structural changes, due to the deregulation of the financial sector and the introduction of the common currency are likely drivers of bank consolidation (Goddard et al., 2007). In fact, from 1985 to 2004, the number of banks was decreased from 12,000 to 7,300 (Asimakopoulos and Athanasoglou, 2013). This decrease reflects the level of bank consolidation over this period. In Table 2.2, we summarize the key structural and legislative changes that took place in Europe over the past decades.

2.5. Methodologies of evaluating M&A

In the extending literature of bank M&As there are several techniques to evaluate the financial performance of the merging firms. Kolaric and Schiereck (2014) outlined three dominant types of studies: event studies, performance studies, and efficiency studies. The event study approach utilizes equity return data to evaluate the stock market reaction around the announcement of a proposed merger. The performance studies compare pre-and post-merger accounting ratios in an effort to identify any

⁷ Molyneux (2007) summarizes the basic characteristics of the evolution of the European banking system.



Table 2.2

Summary of key structural changes in the EU.

1977	First Banking Directive. Removed barriers for cross-border financial operations within the EU, such as the establishment of branches.
1988	Basel 1. The establishment of the minimum capital requirements (8%), and the introduction of Tier 1 capital.
1988	Directive on Liberalization of Capital. Removed all barriers in capital movements across EU member states.
1989	Second Banking Directive. Establishes the EU single licence: any financial institutions that is legally authorized in one EU country is allowed to create branches in any other EU country.
1993	Investment Services Directive. Sets the regulatory framework for investment firms.
1999	Financial Services Action Plan (FSAP). A six year program aimed to harmonize the market for financial services across the member state.
1999	Introduction of the Euro.
2002	Financial Conglomerates Directive. Sets the legislative and supervisory framework for financial conglomerates that engage in cross-border operations (such as M&As).
2004	New EU takeover Directive. Creates the proper environment for cross-border M&As within the EU.
2005-2010	White paper on financial services policy. Attempt to promote EU integration by removing the remaining barriers for convergence.
2006-2008	Basel 2. Incorporates changes of the initial Basel 1 Accord. These changes were aimed to improve the consistency of capital and leverage ratios.
2010-2011	Basel 3. A third attempt to strengthen bank capital, increase liquidity and decrease leverage.
2013	Banking Prudential Requirements-Directive. Sets stricter prudential requirements for banks in order to prevent future failures.
2014	Single Resolution Mechanism. Establishes the resolution procedure for banks that are supervised by the ECB.

potential merger-related improvements in profitability, costs, leverage, loan capacity, and capitalization. Lastly, in efficiency studies, several parametric and non-parametric techniques are used to evaluate whether merging firms are close on the estimated efficiency frontier.⁸ In our thesis, we are particularly interested in investigating the potential sources of shareholder value in bank M&As. As such, we

⁸ The majority of literature review papers like Rhoades (1994) and DeYoung et al (2009) incorporate the efficiency studies in the performance category. See Kolaric and Schiereck (2014) for a similar classification with this thesis.



basically employ the event study analysis in all our research papers. A detailed description of this methodology will be followed in the next section of this chapter.

2.5.1. Event Study methodology

The event study methodology was introduced by Fama et al. (1969). The authors examined how fast security prices adjust to new information in stock-splits. This approach was later extended by Brown and Warner (1985), using daily data. In this regard, Bonnier and Bruner (1989) apply the event study methodology to quantify the excess returns that emerge from a management change in distressed firms.⁹ Kothari and Warner (1997) differentiate from previous studies by employing the event study approach over a long-term horizon. In the M&As literature, several early studies use this approach to quantify potential wealth gains at the merger announcement date (Dodd and Ruback, 1977; Bradley, 1980; Asquith, 1983).¹⁰

The event study approach is based on the aspect of abnormal returns. As abnormal return of a stock i we define the excess return we get if we subtract the actual return from the expected returns calculated with an asset-pricing model. To ensure that the expected returns are unaffected from the event, model parameters are estimated for a period of days or weeks before the official event date. Therefore, the application of this methodology requires two time-series of return data for each event: an estimation period, and an event period for computing the excess returns based upon the estimated parameters. The most frequently-used asset-pricing models in the literature are the (i) market model, (ii) market adjusted returns model, (iii) mean adjusted returns model, (iv) Market model with Scholes–Williams beta estimation (v)

⁹ MacKinlay (1997) and Binder (1998) offer analytical reviews regarding the evolution of the event studies in the economic literature.

¹⁰ See Jensen and Ruback (1983) for a comprehensive review of this M&As studies.



Fama-French three-factor model and (vi) Fama-French-momentum four-factor model.

Market model

Assuming that security returns are estimated using the market model,

$$R_{i,t} = a_i + \beta_i R_{m,t} + e_{i,t} \quad (1)$$

The $R_{m,t}$ is the return of a market index on day t ; $R_{i,t}$ is the return of the i^{th} firm on day t ; $e_{i,t}$ is a random variable with an expected value of zero and uncorrelated with $R_{m,t}$.

Lastly, a and β are the market model parameters. The estimated parameters of model (1) are used to compute abnormal returns as follows:

$$AR_{i,t} = R_{i,t} - (\hat{a}_i + \hat{\beta}_i R_{m,t}) \quad (2)$$

Where $AR_{i,t}$ is the abnormal return of firm i on day t ; \hat{a}_i and $\hat{\beta}_i$ are the OLS estimates from model (1), and the t indexes days or weeks of the event window.

Market adjusted returns model

Market adjusted returns are computed if we subtract the observed return of a selected market index in day t from the actual returns of the i^{th} firm's stock on the day t . In other words:

$$AR_{i,t} = R_{i,t} - R_{m,t} \quad (3)$$

Mean adjusted returns model

The mean adjusted returns are computed if we subtract the arithmetic mean of the i^{th} firm's stock returns from the actual returns of the i^{th} firm's stock on the day t .



$$AR_{i,t} = R_{i,t} - \bar{R}_i \quad (4)$$

Market model with Scholes –Williams beta estimation

For non-synchronous trading, a common variation of the market model is the one introduced by Scholes and Williams (1977). The Scholes-Williams beta estimation is:

$$\hat{\beta}_i^* = \frac{\hat{\beta}_i^- + \hat{\beta}_i + \hat{\beta}_i^+}{1 + 2\hat{\rho}_m} \quad (5)$$

Where, $\hat{\beta}_i^-$, $\hat{\beta}_i$, and $\hat{\beta}_i^+$ are the OLS slope estimates from the linear regression of $R_{i,t}$ on $R_{m,t-1}$, $R_{m,t}$, and $R_{m,t+1}$, respectively, and $\hat{\rho}_m$ is the estimated first-order autocorrelation of $R_{m,t}$.

Fama-French three-factor model

According to Fama-French (1993), security returns follow a three-factor model,

$$R_{i,t} - R_{f,t} = a_i + \beta_i(R_{m,t} - R_{f,t}) + s_iSMB_t + h_iHML_t + e_{i,t} \quad (6)$$

Where $R_{f,t}$ is the one-month Treasury bill rate; $R_{m,t}$ is the return of the market index in the day t ; SMB_t is the difference of the average return on small market capitalization portfolios from large market capitalization portfolios; HML_t is the difference of the average return on two high book to market equity portfolios from the two low book to market equity portfolios. Abnormal returns for the i^{th} firm on day t are defined as:

$$AR_{i,t} = (R_{i,t} - R_{f,t}) - (\hat{a}_i + \hat{\beta}_i(R_{m,t} - R_{f,t}) + \hat{s}_iSMB_t + \hat{h}_iHML_t) \quad (7)$$

Fama-French-momentum four-factor model



This model is a variation of model (iv) with the inclusion of a forth factor introduced by Carhart (1997). Briefly, the expected and abnormal returns will be calculated using the following equations:

$$R_{i,t} - R_{f,t} = a_i + \beta_i(R_{m,t} - R_{f,t}) + s_iSMB_t + h_iHML_t + u_iUMD_t + e_{i,t} \quad (8)$$

Where UMD_t is the moment factor and is composed of the difference of the average return of two high prior return portfolios from the average return on two low prior return portfolios. As before, abnormal returns for the i^{th} firm on day t are defined as:

$$AR_{i,t} = (R_{i,t} - R_{f,t}) - (\hat{a}_i + \hat{\beta}_i(R_{m,t} - R_{f,t}) + \hat{s}_iSMB_t + \hat{h}_iHML_t + \hat{u}_iUMD_t) \quad (9)$$

In a nutshell, these are the most frequently-used asset-pricing models used in event studies. The empirical findings suggest that none of these techniques is superior to the other, since there are no significant differences from using the alternative approaches. However, Cable and Holland (1999) state that market model yields more robust inferences compared to the market adjusted returns and mean adjusted return models.

So far, we presented the estimation of the abnormal returns for a single firm i on a day t . For a group of banks N , we estimate abnormal returns using the following equation.

$$\overline{AR}_t = \frac{1}{N} \sum_{j=1}^N AR_{i,t} \quad (10)$$

Lastly, if we want to calculate abnormal returns for the N banks over an event period (t_1, t_2) we utilize the expression:

$$CAR_{[t_1, t_2]} = \sum_{t=t_1}^{t_2} \overline{AR}_t \quad (11)$$



In case where both bidders and targets are publicly-traded, a common approach is to estimate the combined firm's CARs using the formula of Houston and Ryngaert (1994):

$$\text{Combined CAR} = \frac{MV_i^B \text{CAR}_i^B + MV_i^T \text{CAR}_i^T}{MV_i^B + MV_i^T} \quad (12)$$

Where MV_i^B and MV_i^T represent the market value of equity for the bidder and target firm, one week before the announcement of the merger, and CAR_i^B and CAR_i^T denote the bidder and target CARs, respectively.

Finally, a set of parametric and non-parametric tests are employed to gauge the statistical significance of abnormal returns. Throughout this thesis, the standardized cross-sectional test of Boehmer et al. (1991) is used as the parametric test. Further, to account for the possibility that abnormal returns do not follow a normal distribution, the non-parametric test of Corrado (1989) is also employed. Both tests are analyzed in later chapters of this thesis.

In the next part of this analysis we review bank M&As studies from the U.S. and the EU that have utilized the event study approach to examine the financial performance of the merging firms around the announcement date.

2.5.2. U.S. bank M&As studies

Table 2.3 reviews several studies that examine the shareholder wealth effects in U.S. bank M&As. Overall, empirical findings are mixed, and depend on the examination period. Early studies focus on quite small samples and document positive abnormal returns for acquiring firms (Lobue, 1984; Desai and Stover, 1985). However, from the late 1980s and beyond, the majority of studies suggest a wealth transfer from the

bidder to the target company: 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 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. In their recent study on TBTF mergers, Brewer and Jagtiani (2013) document positive combined abnormal returns for the 8 merger deals during 1991-



Table 2.3

Overview of event studies in U.S. bank M&As

Authors	Year	N	Results
Lobue	1984	37	Positive bidder CARs.
Desai and Stover	1985	18	Positive bidder CARs.
Neely	1987	26	Zero bidder CARs, statistically positive target CARs.
Sushka and Bendeck	1988	41	Mixed findings for bidder CARs.
Hannan and Wolken	1989	69	Insignificant combined CARs, negative bidder CARs, positive target CARs.
Baradwaj et al.	1990	53	Acquiring banks experience less negative CARs in hostile deals.
Cornett and De	1991	37	Both bidders and targets experience positive abnormal returns at the announcement date.
Cornett and Tehranian	1992	30	Negative abnormal returns for bidders, positive for targets.
Houston and Ryngaert	1994	153	Negligible combined CARs, higher abnormal returns for banks with geographical overlap.
Toyne and Tripp	1998	68	Negative abnormal returns for bidders, positive for targets.
Brook et al.	1998	60	Higher abnormal returns after the passage of the Riegle-Neal Act.
Kwan and Eisenbeis	1999	94	Positive abnormal returns are detected for the combined entity.
Becher	2000	558	Zero abnormal returns for bidders, 22% mean target CARs, 3% mean combined CARs, over a 36-day window (-30,+5).
Brewer et al.	2000	242	Higher target CARs after the passage of the Riegle-Neal Act.
Kane	2000	110	Giant U.S. banks gain more value from M&As.
DeLong	2001	280	Product-and activity-focused mergers experience combined CARs in the order of 3.0%.
Houston et al.	2001	64	Negative abnormal returns for acquirers, positive for targets, positive revaluations of the combined entity.
Anderson	2004	97	Positive combined CARs of 1.70%. Negative abnormal returns for bidders, positive for targets.
Becher and Cambell	2005	443	Positive combined CARs of 0.93%. Negative abnormal returns for bidders (-1.29%), positive for targets (16.70%).
DeLong and DeYoung	2007	216	Redistribution of wealth from the bidder to the target firm.
Hagendorff et al.	2008	151	Negative bidder CARs in various event windows.
Becher	2009	114	Positive gains around the passage of the Riegle-Neal Act for the 65 firms that became bidders after its enactment.
Brewer and Jagtiani	2013	406	Significant value creation for M&As that result in a TBTF bank.
Filson and Olfatti	2014	168	Positive combined CARs that increase with the level of product-diversification.

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. 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. In addition, 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. 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.



Table 2.4

Overview of event studies in European bank M&As

Authors	Year	N	Results
Tourani-Rad and VanBeek	1999	56	Insignificant bidder gains. Positive CARs for the 17 listed targets (4.46%).
Cybo-Ottone and Murgia	2000	72	Mixed results for bidders. Positive CARs for targets and the combined entity
Beitel and Schiereck	2001	98	Significant positive returns for the combined entity, positive for targets, insignificant for bidders.
Bietel et al.	2004	98	Positive target and combined CARs, insignificant bidder CARs. Frequent bidders experience lower abnormal returns.
Scholtens and de Wit	2004	20	Significantly higher abnormal returns for EU mergers than U.S. mergers.
Lepetit et al.	2004	180	Positive bidder CARs of 2.06% for bidder of product-diversified deals.
Ismail and Davidson	2005	102	Higher bank to bank returns rather than cross border deals.
Campa and Hernando	2006	244	Negative bidder CARs, positive target CARs. Higher abnormal returns for domestic deals.
Lensink and Maslennikova	2008	75	Domestic and bank-to-bank cross-border deals create value for acquiring firms' shareholders.
Hagendorff et al.	2008	53	Higher abnormal returns for EU bidders compared to U.S. bidders.
Ekkayokkaya et al.	2009	963	Higher bidder abnormal returns for the pre-euro period.
Beltratti and Paladino	2013	139	Zero bidder CARs at the announcement date. Positive bidder CARs at the deal completion date.
Asimakopoulos and Athanasoglou	2013	145	Insignificant bidder CARs for the whole sample. Significant CARs for the 75 listed targets.

2.5.3. European bank M&As studies

Much of the extant literature focuses only to U.S. bank mergers. However, since the late 1990s, there is also a growing literature for the European banking industry. The consensus view in these studies is that European bank M&As create more value than U.S. bank mergers (Scholtens and de Wit, 2004; Hagendorff et al., 2008. DeYoung et al., 2009). However, as we will discuss below, this value creation depend on the examination period. Table 2.4 reviews all the relevant studies

In their early study, Tourani-Rad and Van Beek (1999) examine 56 European bank mergers announced from 1989 to 1996. The authors find zero abnormal returns for



bidders, and positive abnormal returns for targets in the order of 4.46%. Notably, this figure is substantially smaller from what reported in relevant U.S. studies. Cybo-Ottone and Murgia (2000) find positive bidder, target, and combined CARs for a sample of 72 acquisitions. However, bidder gains disappear when the Datastream bank index is used as the benchmark portfolio. Beitel and Schiereck (2001) find significant positive combined CARs for a sample of 98 bank M&As, while Ismail and Davidson (2005) document marginally positive bidder gains.

In an effort to explain the variation in abnormal returns, several studies examined whether the geographical-or product-diversification relates to higher abnormal returns. The empirical findings suggest that banks that expand domestically earn higher abnormal returns than banks that engage in cross-border mergers (Beitel et al., 2004; Campa and Hernando, 2006). In their recent study Asimakopoulou and Athanasoglou (2013) find that geographically-focused mergers are value creating only when the target firm is publicly-traded. This finding outlines the importance of the stock markets as effective monitors of firms' performance. Lepetit et al. (2004) examine 206 M&As over the period 1991 to 2001 and find positive and significant bidder returns only for product-diversified deals. Contrary to the aforementioned findings, Lensink and Maslennikova (2008), find that cross-border bank-to-bank deals create more value for acquiring firms' shareholders. Ekkayokkaya et al. (2009) utilize a large sample of 963 deals, and find that bidder gains have fallen with the introduction of the euro, due to increased competition in the market for corporate control. Finally, Beltratti and Paladino (2013) argue that in crisis period we should better examine returns at the deal completion date, due to the increased uncertainty for the final materialization of the proposed merger. As such, they document zero abnormal returns at the announcement date and positive at the completion date.



2.5.4. Advantages –Disadvantages of Event Studies

The event study methodology constitutes the most widely-used technique for evaluating bank M&As. The main advantage of this technique is that it can isolate the performance of a managerial decision or an exogenous event. In our case, the magnitude of abnormal performance provides a measure of the impact of the merger on the acquiring firms' shareholders wealth. To this extent, the event study approach is a simply methodology that enables us to investigate whether a proposed merger is anticipated as value-creating by the market, or not.

Despite its simplicity, the event study methodology is appropriate mostly for short-term horizons. Rhoades (1994) suggests that it is likely to find significant results in a two-day event window, but as the period is extended the significance disappears. On the other hand, extending the event windows may lead to biased results, due to the possibility that other corporate events could take place over this period. In addition, Binder (1998) suggests that the abnormal returns estimators may suffer from several statistical issues such as: (i) cross-sectional correlation, (ii) different variance across banks, (iii) time dependency, and (iv) high variance of stock returns during event windows. For these reasons, we employ several robustness tests in our analyses, to account for these potential problems. Finally, one more limitation of the event studies is that they require stock return data. As a result, it is impossible to apply this technique in mergers between privately-held firms.

Chapter 3

U.S. bank M&As in the post-DFA era: do they create value?

3.1. 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.

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 an increase in bank merger activity in the post-DFA era. 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 download merger data for 640 completed bank mergers announced between 1990 and 2014. We observe that after the passage of the Act, 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, with consolidated assets of less than \$10 billion, 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 medium-sized

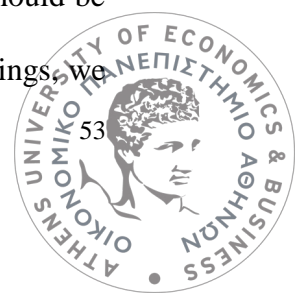


and large banks provided counter-motives for these institutions to grow larger through M&As.

To address our research question, we examine shareholder wealth effects for all 640 mergers and we breakdown the sample into two sub-periods, based on whether the deal was announced before or after the Act's passage. At a univariate level, we find conclusive evidence that bidder and combined abnormal returns for small bank M&As are significantly higher in the post-DFA era. However, this difference in market reaction may simply be a size effect, since bidding banks are significantly smaller after the DFA. Hence, to ensure that the new reform is indeed the cause of the observed pattern in abnormal returns, we conduct several Difference-in-Differences regressions, which include several bank-and deal-specific variables, frequently used in the M&A literature. The results of this analysis provide robust evidence that the market response for small deals is significantly higher after the reform, even after accounting for factors such as size, profitability and method of payment.

After documenting that small bank mergers create more value in the post-DFA era, we examine a possible explanation for this DFA effect. As such, we conduct several cross-sectional regressions for the sample of 83 mergers that were announced after the passage of the Act. 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 or method of payment.

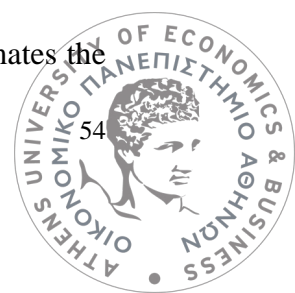
If the hypothesis of a DFA effect on small bank merges is correct, then it should be evident only in the U.S. market. Therefore, to test the robustness of our findings, we



collect a comparable sample of European bank mergers. Results for the European sample indicate that the market does not react differently to small bank mergers in the post-DFA era, suggesting that the DFA is the main cause of our results and not other potential influential factors such as international economic conditions or the passage of Basel III.

Our study is related to the extensive literature on U.S. bank M&As. 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), Brewer and Jagtiani (2013), 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 negative abnormal returns, targets experience large and statistically significant positive abnormal returns and the combined firms' abnormal returns are insignificant. Our results differentiate from what reported so far, since in the post-DFA era, bidders of small mergers experience zero abnormal returns at the announcement, and combined CARs for such deals are in the order of 3.44%, and statistical significant at 1%. In economic terms, such figure translates into a shareholder value increase of \$23.09 million for the average small bank merger.

Our study is also related to the body of literature that examines the efficacy of the DFA in achieving its core objectives. 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. Furthermore, Akhigbe et al. (2016) find that excessive risk-taking by large banks has substantially declined following the passage of the DFA. 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. In our study, we report that merging activity for medium-size and particularly for large banks is substantially lower after the reform compared to the pre-crisis levels, since getting larger is associated with additional activity-based restrictions under the DFA.

Overall, 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, and we analyze the different effect of the new legislation on small, medium-sized, and large banks, respectively. Second, we provide conclusive evidence that the market reacts more favorable to the announcement of small bank mergers in the post-DFA era. In addition, we attribute this finding to the fact that mergers below the \$10 billion asset-size threshold offer a positive trade-off between economies of scale and the cost of regulation.

The remainder of the paper is organized as follows. Section 2 analyzes the key provisions of the DFA that are likely to affect bank merger activity for small, medium-sized and large bank institutions, respectively. Section 3 details the data collection for the empirical analysis. Section 4 describes the methodology. Section 5 presents our empirical results and Section 6 provides several robustness tests. Lastly, Section 7 concludes the paper.

3.2. 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. For example, 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. Additionally, Section 623 authorizes regulators not to approve a proposed merger transaction if the resulting depository institution would hold more than 10% of all Federal Deposit Insurance Corporation’s (FDIC) deposits. In practice however, 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 (Skeel, 2011).

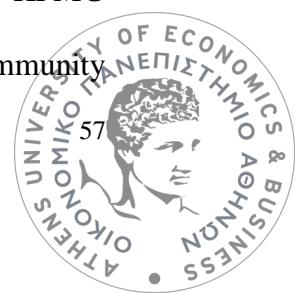
At the same time, the DFA includes several provisions that do not directly address the bank M&A issue, but could reshape the U.S. banking industry in such a way that consolidation might be inevitable. The new regulatory regime introduces specific asset-size cut-offs (\$10 billion and \$50 billion) and imposes strict reforms for banks that exceed these thresholds. All these reforms may provide motives or counter-motives for banks to grow larger through M&As. At the later parts of this section we

analyze the DFA effect on the different groups of banks, as well as the possible relationship between the new legislation and bank merger activity in the U.S. 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.

3.2.1. Small banks under DFA

Traditionally, federal regulation 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 this “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 regulations include some form of exemption for small banks. In fact, of the 14 major provisions of the DFA, 13 either include an exemption for small banks or are tailored to provide these institutions with relief from specific regulations (Hoskins and Labonte, 2015).

At first glance, small banks seem to be unaffected from the passage of the Dodd-Frank Act. However, the DFA incorporates more than 500 separate rules and mandates governing all depository institutions. The implementation of such reforms is associated with increased compliance costs. Compliance costs are the costs the bank must bear in 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. Recent empirical evidence suggests that the DFA is quite burdensome for small institutions in terms of compliance. 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. 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.

3.2.2. Medium-sized banks under DFA

Under the Dodd-Frank Act, banks that exceed \$10 billion in assets are subject to a many activity-based restrictions. More precisely, Title X of the DFA requires the establishment of the Consumer Financial Protection Bureau (CFPB).¹¹ 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 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.¹² 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 are applicable to medium-sized and large banks and effectively single out small institutions.

¹¹ Section 1011 designates the creation of the CFPB.

¹² Debit fees are limited to a \$0.21 plus 0.05% of the transaction value, about half the pre-DFA average fees.



3.2.3. Large banks under DFA

For banks that exceed \$50 billion in assets, the DFA imposes even stricter regulatory requirements. Title I of the DFA establishes a new powerful regulatory body; the Financial Stability Oversight Council (FSOC).¹³ 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.

3.2.4. DFA and merging activity

The DFA regulatory 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. 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. 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. Peirce et al. (2014) surveyed 200 small banks in their study, and reported that more than 25% of these banks were contemplating M&A strategies to adjust to the DFA compliance costs. Bindal et al. (2017), suggest that banks with less than \$10 billion in assets are 12.5% more likely to engage in M&As after the DFA's enactment.

¹³ Subtitle A (sections 111-123) refers to the establishment and authorities of the FSOC.



As mentioned above, the DFA has a different effect on medium-sized and large institutions. It is reasonable that medium-sized and large firms will commit fewer resources for regulatory compliance than small firms, as a proportion to their overall revenues. As such, these institutions would be less tempted to merge with the intention to spread the DFA compliance costs over a larger asset base. However, 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, which are designated to prevent these institutions from engaging in excessively risky (and highly profitable) activities. Contrary to compliance costs, the costs of these reforms could not be absorbed by getting larger, since the restrictions increase with size. Thus, as banks grow larger beyond the specified thresholds, the trade-off between economies of scale and opportunity costs may not be particularly lucrative to provide medium-sized and large banks with the intention to engage in M&As.

3.2.5. DFA effect on announcement period returns

The stock market reaction's at the announcement of a merger reflects the investors' perception about the value created or destroyed by the merger (DeYoung et al. 2009). Value-creating mergers should provide a positive trade-off between merger-related financial gains and costs. In the post-DFA era, small banks are likely to engage in more M&As, in order to spread the compliance costs over a larger asset base. In addition, small banks with less than \$10 billion in assets are subject to many regulatory exemptions, which provide these institutions with a competitive advantage against their larger rivals. As such, mergers below the \$10 billion asset-size threshold offer both the potential for operating efficiencies though compliance cost-savings and less regulatory supervision. We therefore predict a positive trade-off between



economies of scale and the cost of regulation for small bank mergers after the DFA. In this case, stock market reaction at the announcement of these mergers should be more positive than before the passage of the new legislation. On the contrary, this DFA effect on announcement period returns should not be evident on larger deals, since larger institutions have higher capacity for regulatory compliance, and the DFA activity-based restrictions increase with their size. Hence, it is likely, that any merger-related cost-savings would be inadequate to offset the cost of the new regulations for such institutions. Consequently, we do not expect that market participants would anticipate such deals as value-creating events. In sum, we expect to find higher abnormal returns for small bank mergers after the Act's enactment, and we also expect to find a positive relation between these returns and potential cost-savings for such mergers.

3.3. Sample description and statistics

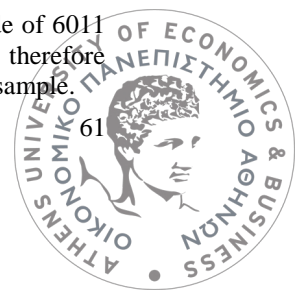
3.3.1. Merger sample

Our bank M&As data is collected from the Thomson ONE database. Mergers are manually confirmed against the National Information Center (NIC) database.¹⁴ 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 6712.¹⁵

¹⁴ 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.

¹⁵ 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.



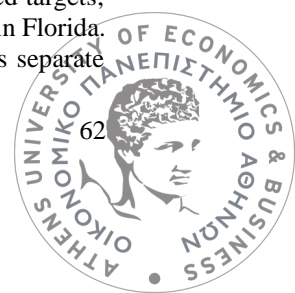
2. The announcement of the merger is between January 1, 1990 and December 31, 2014.
3. Both bidders and targets are U.S. public firms listed on NYSE, Amex, or Nasdaq.
4. Both bidders and targets have available return data on the Center for Research in Security Prices (CRSP) around the merger announcement date and Compustat data for the year-end prior to the merger announcement.
5. The bidder acquired an interest of above 50% in a target, raising its interest from below 50% to above 50%.¹⁶
6. All deals are completed.

The criteria result in an initial sample of 670 bank mergers. From this sample we exclude 19 mergers, because stock return data were available on the Center for Research in Security Prices (CRSP) for either the bidder or the target firm, but the data ends before the announcement date. We also excluded 2 mergers due to the fact that both targets were incorrectly classified as publicly traded firms on the Thomson ONE database.¹⁷ In line with Vallascas and Hagendorff (2011), we also exclude 8 mergers which involved failing institutions, as reported by Thomson ONE.¹⁸ One additional merger was removed due to the fact that the bidder experienced extraordinary returns at the announcement date, distorting the

¹⁶ 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.

¹⁷ 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.

¹⁸ Cowan and Salotti (2015), suggest that failed bank acquisitions should be considered as separate events comparing to non-failed bank acquisitions.



calculation of the average abnormal returns.¹⁹ The final sample consists of 640 mergers, where 557 of the deals were announced in the pre-DFA period, and the remaining 83 mergers were announced after the Act's enactment on July 21, 2010.

3.3.2. Evolution of bank mergers overtime

Figure 3.1 illustrates the evolution of U.S. bank M&As from 1990 to 2014 for small, medium-sized, and large mergers respectively. 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 deals follows an upward trend in the first half of the decade for all three types of mergers. Notably, merger activity for small and medium-sized mergers skyrocketed in the late 1990s. In the early 2000s, the level of banking consolidation was slightly decreased, although the industry experienced a peak in M&As deals in 2004. The bank merger activity then plummeted, as a result of the recent financial crisis.

Historically, regulatory intervention was a chief motivation for consolidation within the banking industry. Interestingly, after the DFA's enactment in the end of 2010, we observe that the number of small bank mergers exhibits an increasing trend. Data for the medium-size mergers suggest that M&As activity has started to rebound in this asset-size category, despite the fact that the annual number of deals has yet to reach the pre-crisis levels. On the other hand, large bank mergers are on their lowest point since the beginning of the examination period. These results are consistent with Bindal et al. (2017), who document that in the post-DFA era, banks below the \$10 billion threshold become more acquisitive, while banks below the \$50 billion threshold become less acquisitive. Overall, we suggest that consolidation between

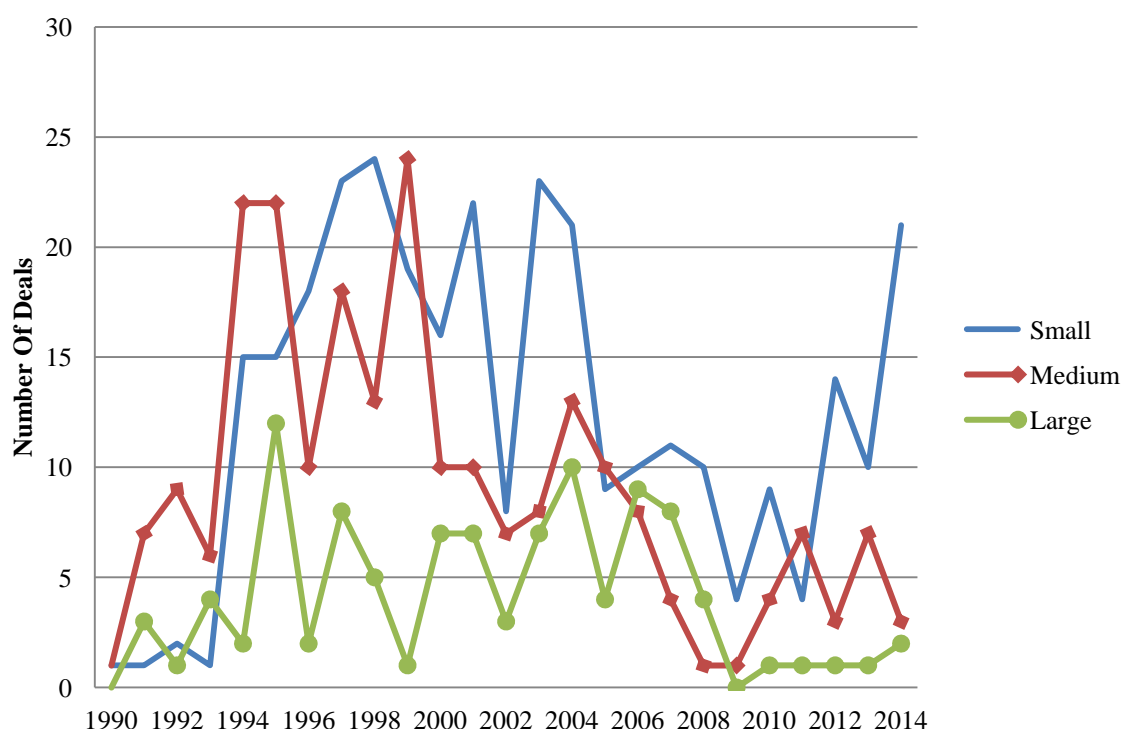
¹⁹ FNB United Corp. experienced an abnormal return of 60.07% on the announcement day.



Figure 3.1

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

The figure illustrates the annual number of deals of completed U.S. bank mergers announced between 1990 and 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. Small medium-sized, and large mergers represent those mergers with combined firms' assets of less than \$10 billion, between \$10 billion and \$50 billion, and 50 billion and above, respectively. Merger data are collected from Thomson ONE database.



U.S. banks was rejuvenated after the passage of the DFA. However, as shown in Figure 3.1, this consolidation is mainly driven by small bank mergers.

3.3.3. Summary statistics

Table 3.1 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 and B partition the sample based on whether the merger was announced before or after the DFA enactment. Further, we report summary statistics for the bidder, target and combined firm's total assets for both periods.

Interestingly, before the DFA, approximately half of the bidding firms $((59+216)/557=49.37\%)$ and almost 90% of the target firms $((293+206)/557=89.59\%)$ were below the \$10 billion mark. After the DFA, firms engaging in a merger are more likely to be smaller since 73.49% of the bidders (61 out of 83) and the 95.18% of the targets (79 out of 83) involve firms with assets below \$10 billion. For the two firms combined, small mergers in the pre-DFA period are less than half of the sample $((37+218)/557=45.78\%)$, whereas medium-sized, and large mergers are 36.80% (205 out of 557) and 17.41% (97 out of 557) of the remaining sample, respectively. 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 deals after the Act's enactment (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.

Panel C of Table 3.1 provides the number of bidding firms that crossed the several asset-size thresholds in both periods. In the pre-DFA period, 22 banks crossed the \$1 billion mark, 20 crossed the \$10 billion mark, and 18 crossed the \$50 billion mark. After the DFA, all 5 very small bidders crossed the \$1 billion mark post-merger, while only 6 firms out of the 56 small bidders exceeded the \$10 billion threshold via M&As. The intriguing part of this analysis is the fact that none of the 16 medium-sized bidders attempted to surpass \$50 billion in total assets and be designated as

Table 3.1**Distribution of merging firm's assets**

The table illustrates the distribution of the merging firms' total assets for 640 completed bank mergers announced between 1990 and 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 and B segment the sample based on whether the merger was announced before or after the enactment of the Dodd-Frank Act (July 21, 2010). For the two separate sub-periods, we report summary statistics for the bidder, target and combined firm's total assets at year-end prior to the merger announcement (in \$ billion). Panel C provides the number of bidding firm the crossed the asset-size thresholds in both periods.

Panel A: Pre-DFA	V. Small	Small	Medium	Large
<i>Bidders</i>	59	216	203	79
Mean	0.562	4.226	25.508	178.273
Median	0.545	3.510	23.034	101.82
Min	0.097	1.032	10.094	50.856
Max	0.997	9.856	49.902	1715.746
Std. Dev.	0.265	2.591	11.648	245.433
<i>Targets</i>	293	206	38	20
Mean	0.456	2.985	22.765	147.033
Median	0.414	2.340	21.397	79.382
Min	0.050	1.002	10.540	51.238
Max	0.996	9.711	46.679	782.896
Std. Dev.	0.245	2.049	10.614	168.518
<i>Combined</i>	37	218	205	97
Mean	0.601	4.189	25.447	195.046
Median	0.629	3.646	22.666	105.526
Min	0.157	1.019	10.033	50.064
Max	0.995	9.862	49.342	1927.476
Std. Dev.	0.218	2.440	11.705	283.205
Panel B: Post -DFA	V. Small	Small	Medium	Large
<i>Bidders</i>	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
<i>Targets</i>	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
<i>Combined</i>	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
Panel C: Crossing thresholds		\$1 billion	\$10 billion	\$50 billion
Pre-DFA		22	20	18
Post-DFA		5	6	0

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.²⁰ 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 through 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 (Balasubramanian and Cyree, 2014; Akhigbe et al., 2016; Gao et al., 2018).²¹

Table 3.2 displays summary statistics for our whole sample. Further, we partition the sample based on whether the merger was announced before or after the DFA's enactment. The last column of Table 3.2 reports differences in means and medians between these two sub-periods.

Panel A of Table 3.2 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 bidder is substantially larger and more profitable than the average target both before and after the DFA. In addition, after the Act's enactment, bidding banks are significantly smaller, while both bidders and targets are less profitable and better capitalized, which is consistent with the low-profitability environment of the post-crisis period and the increased capital requirements of the new regulatory regime. Deal values in the post-DFA era are smaller by approximately \$1 billion, and the difference between the two periods is statistical significant at 10% level. We also observe that on average, acquisition

²⁰ People's United Financial, Inc. (Nasdaq: PBCT) merged with Danvers Bancorp, Inc. (Nasdaq: DNBK). The combined firms' assets are \$27.89 billion.

²¹ 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.



Table 3.2**Summary statistics**

This table summarizes descriptive statistics for a sample of 640 completed bank mergers announced between 1990 and 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. We report summary statistics for the whole period as well as for the two separate sub-periods (Pre-DFA, and Post-DFA). Difference represents the differences in mean and median values between Post-DFA and Pre-DFA periods. Panel A displays statistics for several variables. All variables are defined in the Appendix (Table 3.1). 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. Target's equity percentages sought and acquired represent the proportion of target's equity the bidder sought and managed to acquire, respectively. Median values are in brackets. Significance for differences in means (medians) is based on the *t*-test (Mann-Whitney test). The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	All	Pre-DFA	Post-DFA	Difference
Panel A: Variables				
Bidder Assets (in billion \$)	36.497 [9.220]	36.862 [10.158]	13.489 [5.536]	-23.373* [-4.622]***
Target Assets (in billion \$)	7.442 [0.913]	8.176 [0.896]	2.515 [0.985]	-5.661 [0.089]
Relative Size	0.301 [0.147]	0.294 [0.136]	0.350 [0.240]	0.056 [0.104]***
Bidder ROA	1.060 [1.079]	1.113 [1.136]	0.701 [0.817]	-0.412*** [-0.319]***
Target ROA	0.746 [0.888]	0.817 [0.938]	0.273 [0.455]	-0.544*** [-0.483]***
Roadiff	0.314 [0.208]	0.296 [0.202]	0.428 [0.256]	0.132 [0.54]
Bidder equity-to-assets	0.079 [0.081]	0.072 [0.079]	0.126 [0.116]	0.054*** [0.037]***
Target equity-to-assets	0.092 [0.084]	0.090 [0.083]	0.107 [0.100]	0.017*** [0.017]***
Bidder Employees (in thousands)	10.009 [2.975]	11.254 [4.880]	2.727 [1.324]	-8.527*** [-3.556]***
Target Employees (in thousands)	3.020 [0.292]	3.662 [0.335]	0.437 [0.238]	-3.224** [-0.097]***
Deal Value (in billion \$)	1.193 [0.164]	1.324 [0.167]	0.318 [0.132]	-1.006* [-0.035]
Bid Premium	1.359 [1.298]	1.352 [1.286]	1.400 [1.342]	0.51 [0.056]
Days to Completion	181.938 [186.50]	177.874 [167.00]	209.20 [188.00]	31.33*** [21.00]***
Panel B: Deal characteristics				
% of cash deal	9.68	10.77	2.41	
% of stock deal	55.47	57.27	43.37	
% of both cash and stock deal	34.85	31.96	54.22	
% same state deals	47.66	47.58	48.19	
% Target's equity sought in transaction	99.72	99.68	100.00	
% Target's equity acquired after transaction	99.71	99.68	99.93	

premiums do not differ after the passage of the DFA. Days to Completion is the time interval between the announcement and the completion date, and serves as the proxy

for merger complexity (Becher and Campell, 2005). We find that deals in the post-DFA era took a significant longer time to be completed than deals announced before the Act's passage. We could offer several possible explanations for this latter finding. For example, due diligence process in the post-crisis years may be more time-consuming, due to increased opacity in target bank's assets. Alternatively, this difference may reflect the more stringent regulatory environment for bank M&As in the post-DFA era.

Panel B of Table 3.2 provides additional descriptive information. Before the DFA, stock financing was the prevailing method of payment for bank M&As, while in the post-DFA period, bidders prefer to pay with a combination of stock and cash. Lastly, the percentages of deals between banks that are headquartered in the same state suggest an equally divided distribution between intrastate and interstate mergers throughout the whole examination period.

3.4. Methodology

We employ both univariate and multivariate approaches in order to investigate whether there is any DFA effect on the U.S. bank M&As: (1) we estimate bidder, target, and combined cumulative abnormal returns for the whole sample of 640 mergers and for the two separate subsamples (Pre-DFA, Post-DFA) around the announcement day, and we breakdown these samples using two asset-size cutoffs (\$10 billion, \$50 billion), (2) we estimate several difference in differences regression models to examine if there is indeed a DFA effect on announcement returns in small bank mergers, and (3) we use multivariate regression techniques in order to explain the variation in the estimated cumulative abnormal returns for deals announced Post-DFA.



3.4.1. Event study

We employ the standard event study methodology outlined in Brown and Warner (1985). We use the OLS to estimate the parameters of the following market model:

$$R_{i,t} = a_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (1)$$

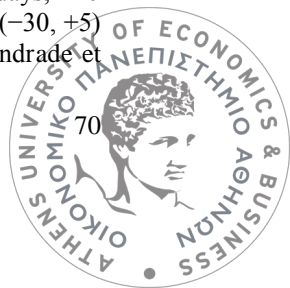
Where the dependent variable $R_{i,t}$ is the daily market return for stock i , $R_{m,t}$ is the daily return on the CRSP NYSE/Amex/Nasdaq value-weighted index (with distributions), and $t = (-200, -21)$ indexes days prior to the announcement of the merger.²² We estimate the daily abnormal returns for each firm as follows:

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,t}) \quad (2)$$

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.²³ 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. Further, to account for the non-normal distribution of the security returns, we test the statistical significance of the median values by using the Wilcoxon signed-rank test.

²² 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.

²³ We also computed cumulative abnormal returns for other event windows $(-5 \text{ days to } +1 \text{ days}, -10 \text{ days to } +1 \text{ days}, \text{ and } -10 \text{ days to } +10 \text{ days})$. To capture a possible run-up, we examined the $(-30, +5)$ window. Additionally, we estimated the extended $(-20, \text{completion})$ window suggest by Andrade et al. (2001). The results for both windows were insignificant.



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 640):

$$\text{Combined CAR} = \frac{MV_i^B \text{CAR}_i^B + MV_i^T \text{CAR}_i^T}{MV_i^B + MV_i^T} \quad (3)$$

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.²⁴

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:

$$R_t^p = \ln \left(\frac{MV_{i,t}^B + MV_{i,t}^T}{MV_{i,t-1}^B + MV_{i,t-1}^T} \right) \quad (4)$$

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 (2) to compute its daily abnormal returns.²⁵

²⁴ 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.

²⁵ Both approaches produced identical results.



3.4.2. Difference-in-Differences estimation

The Difference-in-Differences (DiD) approach is typically used to estimate the effects of specific policy interventions or policy changes (such as a passage of a law) on a group of people or firms that are directly treated by these changes (Lechner, 2011). Therefore, such an approach should give us a robust estimate on whether the Dodd-Frank Act has altered the way the market perceives small bank M&As or not.

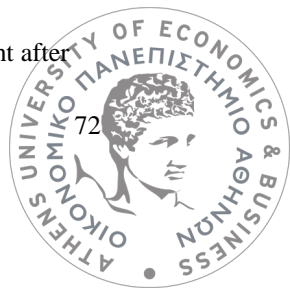
The DiD approach studies the differential effect of a treatment on a “treatment” group versus a “control” group. According to our main hypothesis, the treatment group should be the small bank mergers after the passage of the DFA.²⁶ Hence, to test for the possibility that the stock market reacts differently at the announcement of a small bank merger in the post-DFA era than it did before, we estimate the following DiD regression model:²⁷

$$CAR_{i,t} = \beta_1 DFA + \beta_2 Small + \beta_3 DFA * Small + \beta_4 X_{i,t-1} + \beta_5 Z_{i,t} + \varepsilon_{i,t} \quad (5)$$

Where *DFA* is a dummy variable that equals 1 if the merger announcement day was after the DFA’s enactment, and 0 otherwise, and *Small* is a dummy variable that equals 1 if the combined firms’ consolidated assets are less than \$10 billion, and 0 otherwise. The interaction term between *DFA* and *Small* constitutes the DiD estimator. We therefore expect to find a positive and statistical significant coefficient for β_3 . Lastly, $X_{i,t-1}$ and $Z_{i,t}$ denote bank-and deal-specific variables, respectively (defined in the Appendix, Table 3.1).

²⁶ Since both bidders and targets are publicly-traded, the market should know at the announcement date whether the combined firm’s assets would exceed the \$10 billion threshold, or not.

²⁷ We also examine whether announcement returns for large mergers are significantly different after the Act’s passage.



3.4.3. Cross-sectional analysis of post-DFA abnormal returns

The aforementioned analysis focuses on examining whether abnormal returns for small bank mergers are higher after the passage of the DFA. If this is the case, then it would necessary to investigate the factors that influence this change in market perception for such mergers. Therefore, to control for these possible influences, we regress the estimated cumulate abnormal returns on a vector of firm- and deal-specific explanatory variables frequently used in the literature. Again, all explanatory variables are defined in the Appendix (Table 3.1)

We conduct multiple OLS regressions to explain the variation in merger abnormal returns after the Act's passage. 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.²⁸ 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, mean VIFs range from 3.90 to 4.27 indicating that multicollinearity is not a primary concern in our data.

3.5. Results

3.5.1. Cumulative abnormal returns

In this section, we report bidder, target, and combined firms' announcement CARs for the whole sample of 640 mergers. Then, we examine whether abnormal returns differ significantly between deals announced before and after the Dodd-Frank Act.

²⁸ The highest correlation coefficient among continuous variables is 0.51 (in absolute values) between Acquirer's Size and Relative Size.



We also partition each sample into small, medium-sized, and large bank mergers, in order to investigate whether the market reaction for small bank M&As became indeed more favorable in the post-DFA era.

Panels A and B of Table 3.3 illustrate the results for both bidders and targets for the whole examination period, as well as for the two separate sub-periods, respectively. For the whole sample of 640 mergers, bidder and target announcement CARs are in line with the large extant body of bank merger literature. 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 in all asset-size classifications. In the pre-DFA period also, this pattern in abnormal returns is evident in all subsamples, suggesting that bidders lose and targets gain upon the announcement irrespective of the merger size. Interestingly, results for the 83 M&As announced in the Post-DFA era follow a slightly different pattern. Contrary to the aforementioned results, bidders in small bank M&As do not lose value at the announcement date after the Act's enactment, since abnormal returns for these 55 bidders are indistinguishable from zero. In fact, bidders in small bank mergers experience 1.25% higher abnormal returns on average, after the Act's enactment. Results for bidders of medium-sized and large mergers are qualitatively similar to what reported in the pre-DFA period. In addition, target firms in almost all subsamples (except from the large deals) experience statically higher abnormal returns after the passage of the Act.

Panel C of Table 3.3 reports abnormal returns for the combined entity. Results for the whole period document a modest value creation in the scale of 0.90% for the



Table 3.3**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 640 completed bank mergers announced between 1990 and 2014. The table is separated into 3 different panels. Panels A to C report bidder, target and combined CARs for the whole period as well as for the two separate subsamples (Pre-DFA, and Post-DFA). Difference represents the differences in mean and median CAR between Post-DFA and Pre-DFA periods. Small, medium-sized, and large mergers represent those mergers with combined firms' assets of less than \$10 billion, between \$10 billion and \$50 billion, and \$50 billion and above, respectively. Abnormal returns are estimated using the market model for a three-day event window centered on the announcement date (-1, + 1). The estimation period consists of 180 trading days and ends 21 trading days before the event date. The median CARs are in brackets and the number of mergers is below the medians.. The parametric test is the standardized cross-sectional test, and the non-parametric is the Wilcoxon signed rank test. Significance for the difference between mean CARs is based on the *t*-test. Significance for the difference between median CARs is based on the Mann-Whitney test (in brackets). The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

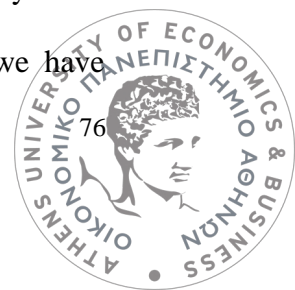
Panel A: Bidders	Whole Period	Pre-DFA	Post-DFA	Difference
All	-1.66% *** [-1.40%] *** 640	-1.73% *** [-1.40%] *** 557	-1.14% ** [-1.05%] ** 83	0.59% 0.35%
Small	-1.51% *** [-1.38%] *** 310	-1.73% *** [-1.40%] *** 255	-0.48% [-0.99%] 55	1.25% * [0.41%]
Medium	-1.83% *** [-1.40%] *** 227	-1.72% *** [-1.37%] *** 205	-2.85% *** [-1.57%] *** 22	-1.13% -0.20%
Large	-1.80% *** [-1.54%] *** 103	-1.77% *** [-1.61%] *** 97	-0.88% [0.30%] *** 6	0.89% [1.91%]
Panel B: Targets				
All	20.00% *** [16.70%] *** 640	18.78% *** [15.61%] *** 557	28.13% *** [23.47%] *** 83	9.35% *** [7.86%] ***
Small	22.18% *** [18.27%] *** 310	20.56% *** [16.82%] *** 255	29.67% *** [21.23%] *** 55	9.11% *** [4.41%] ***
Medium	18.34% *** [15.81%] *** 227	17.31% *** [15.22%] *** 205	27.92% *** [27.38%] *** 22	10.61% *** [12.16%] **
Large	17.09% *** [14.45%] *** 103	17.23% *** [14.17%] *** 97	14.77% [22.58%] 6	-2.46% 8.41%
Panel C: Combined				
All	0.90% *** [0.31%] *** 640	0.69% *** [0.10%] * 557	2.32% *** [1.74] *** 83	1.63% *** [1.64%] ***
Small	1.92% *** [1.08%] *** 310	1.59% *** [0.80%] *** 255	3.44% *** [2.75%] *** 55	1.85% *** [1.95%] ***
Medium	-0.22% [-0.27%] 227	-0.26% [-0.41%] * 205	0.23% [0.68%] 22	0.49% 1.09%
Large	0.31% [-0.61%] 103	0.35% [-0.61%] 97	-0.25% [-0.29%] 6	-0.60% [0.32%]

average bidder-target pair. Segmenting by size, only small deals realize positive merger gains, whereas results for medium-sized and large mergers indicate a redistribution of wealth from the bidder to the target firm. Again, results for the 557 mergers of the Pre-DFA period are similar to what reported for the whole sample of mergers. Combined CARs for all deals are in the order of 0.67%, and only small bank mergers realize statistical significant gains. In the post-DFA period, we find abnormal returns of 2.32% that are statistical significant at 1% level. In fact, combined CARs are approximately 1.63% higher in the Post-DFA era than before, and their difference is statistical significant at 1% level. In accordance with previous findings, this significant value creation is observable only in small bank mergers, since combined CARs for such deals are 3.44%, and statistically significant at the 1% level, whereas medium-sized, and large mergers continue to be value-neutral events even after the DFA passage. However, this market reaction should not only be attributable to the size of the merging firms, given that combined CARs for the 55 small bank M&As are 1.85% higher after the DFA, and the difference between the two periods is statistical significant at 1% level.

At a univariate level, we find evidence consistent with our expectations. Bidder and combined CARs in small mergers are significantly higher after the passage of the DFA, while returns for larger deals do not differ across the two periods. This evidence could imply a DFA effect on small bank mergers that emanates from a positive trade-off between merger gains and the cost of regulation.

3.5.2. Is there a DFA effect on small bank mergers?

The results of the univariate analysis so far confirm our hypothesis for a DFA effect on small bank mergers. However, is it likely that these results are driven by other factors rather than the DFA itself. In a previous section of this paper, we have



documented that bidding banks in the pre-DFA period were significantly larger, and target banks were less capitalized. DeLong and DeYoung (2007) suggest that postmerger performance may be weaker for larger acquiring banks that have already achieved economies of scale, or when the target bank has depleted levels of capital. Hence, we employ several sets of Difference-in Differences regressions, to examine whether this difference in market reaction for small deals post-DFA is indeed attributable to the new legislation, or to a change in the idiosyncratic characteristics of the merging firms.

Table 3.4 presents the results of the Difference-in-Differences regressions. The dependent variable in each regression is the bidder, target, or combined three-day CARs, centered on the announcement date. For each dependent variable we run two separate regressions, due to the fact that the inclusion of Bid Premium reduces the number of usable observation from 640 to 589.²⁹

The first two columns of Table 3.4 report results for the regression of bidder CARs. The DiD estimator is positive and significant at 5% in both models, and the magnitude of its coefficient suggests that bidders in small bank mergers experience a mean 2.3% in the first model and a 2.6% in the second model larger abnormal return after the DFA passage, respectively. These findings indicate that even after controlling for several frequently used bank-and deal-specific characteristics such as firm size, profitability, and method of payment, bidders in small deals experience a more favorable market reaction post-DFA. Results for the target firms on the other hand suggest that the passage of the DFA does not influence announcement abnormal returns in any size category. In fact, the variation of target CARs is mainly explained by the Bid Premium, since a 1% increase in premiums offered translates to

²⁹ For robustness we also run the same regressions where the examination period starts from 1995 and 2000, respectively. The results remained unchanged and reported in Table 3.2 of the Appendix.

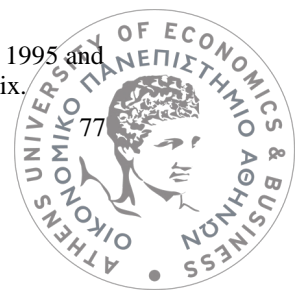


Table 3.4**Difference-in-Differences regression for U.S. bank M&As**

This table summarizes the difference-in-differences regression results for a sample of 640 completed U.S. bank mergers announced between 1990 and 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. In each regression, the dependent variable is the bidder, target, or combined three-day CARs, centered on the announcement date. All independent variables are defined in the Appendix (Table 3.1). All continuous variables are winsorized at 1% and 99% level. The t-statistics reported in parentheses are clustered by bank. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Variables	Bidder		Target		Combined	
Constant	0.003 (0.26)	0.067*** (4.34)	0.378*** (6.47)	-0.300*** (-4.07)	0.016 (1.29)	0.006 (0.34)
State	-0.004 (-0.37)	-0.005 (-0.52)	0.105** (2.28)	0.076*** (2.73)	0.009 (1.12)	0.008 (0.98)
Stock	-0.015*** (-3.08)	-0.015*** (-2.95)	-0.052* (-1.67)	-0.053** (-2.59)	-0.015*** (-2.61)	-0.014** (-2.34)
Combo	-0.018*** (-3.27)	-0.017*** (-2.95)	-0.016 (-0.52)	-0.014 (-0.68)	-0.010 (-1.51)	-0.007 (-1.06)
Relative Size	-0.001 (-0.09)	-0.003 (-0.33)	-0.059** (-2.06)	-0.014 (-0.56)	0.031*** (4.04)	0.032*** (4.03)
Acquirer's Size	-0.001 (-0.46)	-0.003 (-1.14)	-0.007 (-0.86)	0.011 (1.40)	-0.003 (-1.39)	-0.003 (-1.23)
DFA	-0.019 (-1.31)	-0.016 (-1.14)	0.064 (0.97)	0.014 (0.42)	-0.015 (-1.26)	-0.019 (-1.53)
Small	-0.002 (-0.27)	-0.002 (-0.36)	0.025 (1.00)	0.032 (1.41)	0.004 (0.72)	0.004 (0.71)
DFA*Small	0.023** (2.05)	0.026** (2.40)	-0.034 (-0.60)	-0.025 (-0.67)	0.017* (1.81)	0.019** (1.98)
Roadiff	0.000 (1.41)	0.000 (1.39)	0.000 (0.50)	0.000** (2.30)	0.000 (1.51)	0.000* (1.67)
Target-equity-to-assets	-0.060 (-1.33)	-0.134*** (-2.91)	-0.918*** (-4.15)	-0.265* (-1.75)	-0.005 (-0.10)	-0.002 (-0.04)
Days to Completion	0.000 (0.38)	0.000 (1.03)	-0.000** (-2.07)	-0.000*** (-3.55)	-0.000 (-0.16)	0.000 (0.12)
Bid Premium		-0.043*** (-6.12)		0.446*** (9.87)		0.005 (0.68)
N	640	589	640	589	640	589
Adj. R ²	0.011	0.087	0.081	0.481	0.144	0.148

a 0.446% increase in target abnormal returns. These findings are consistent with our expectations, since bidding firms usually seek for regulatory compliance in M&As, while target firm CARs are highly dependent on the acquisition premiums. Finally, we report results for the combined abnormal returns in the last two columns of Table 3.4. The DiD estimator is again positive and significant in both models. Such evidence supports our argument that market participants have a better perception for

small bank mergers in the post-DFA period.³⁰ Further, the sign and magnitude of the coefficient for relative size is in line with previous studies (DeLong, 2003; Becher and Campell, 2005; Brewer and Jagtiani, 2013). In all six models also, the inclusion of stock as the method of payment decreases announcement abnormal returns (Travlos, 1987).

Overall, the DiD regression results confirm what we have found in the univariate tests. Bidder and combined CARs in small bank mergers are significantly higher after the DFA, and this difference in market reaction could not be offset by firm size, pre-merger profitability, capital ratios, method of payment, geographical diversification, or acquisition premiums. Therefore, we find conclusive evidence that there is a positive DFA effect on acquisition announcement returns in small bank mergers.

3.5.3. Determinants of post-DFA gains in small bank M&As

Having established that bidder and combined CARs in small bank mergers are significantly higher after the DFA, we now turn in analyzing the possible determinants of these merger-related gains. If this change in market reaction relates to economies of scale, then we would expect to find a positive relation between CARs and compliance cost savings. Unfortunately, there is no variable in Call reports, FR-Y9, or any other database that measures the dollar amount or time spent on complying with new regulations. For this reason, Cyree (2016), suggest that the number of banks' employees can serve as a proxy for compliance costs as banks may hire additional compliance personnel to adjust to the new regulatory environment. In our analysis, we move a step further and we use the target number of employees as a

³⁰ We use alternative specifications of the DFA dummy to ensure the robustness of our results: (1) the DFA equals one from June 2009 and beyond, since this is the date when the new legislation was initially proposed, (2) the DFA equals 1 from December 2009 and beyond, since this is the date when first version of the DFA passed the House of the Representatives. The results remained unchanged.

proxy for compliance cost savings. Hypothetically, when a bank seeks for regulatory compliance through M&As and acquires another bank with many employees (and probably many compliance specialists), then it is more likely to achieve the necessary economies of scale at a faster pace. Hence, to test this prediction we include an interaction term of Small Mergers with Target Employees in our models, and we expect its coefficient to be positive and significant.

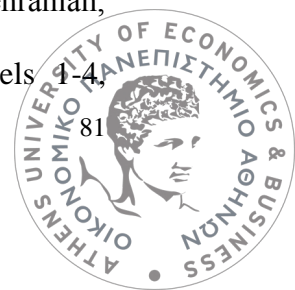
Table 3.5 displays the results from the OLS estimations of bidder CARs. Initially, in models 1 and 2, both Acquirer's Size and Target Employees have insignificant coefficients, suggesting that neither the size of the bidding firm nor the potential for cost-savings could explain the variation in bidder abnormal returns for the whole sample. However, by adding indicator variables based on the combined firms' size, we obtain more conclusive empirical results. In particular, in models 3 and 4, 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 2.5% in model 2 and a 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 10% in both models 5 and 6, 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 7.8% in model 5 and 7.5% in model 6, respectively. This finding suggests that small bidders' returns increase with the potential merger-related compliance cost savings.

Table 3.5**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 the bidder three-day CARs, centered on the announcement date. All independent variables are defined in the Appendix (Table 3.1). All continuous variables are winsorized at 2% and 98% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Variables	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Constant	-0.041 (-0.67)	0.036 (0.53)	0.002 (0.07)	0.031 (0.80)	0.026 (0.91)	0.046 (1.20)
State	-0.003 (-0.35)	0.001 (0.06)	-0.004 (-0.42)	-0.001 (-0.15)	-0.007 (-0.73)	-0.006 (-0.66)
Stock	-0.013 (-0.60)	0.004 (0.11)	-0.014 (-0.96)	0.000 (0.01)	-0.016 (-0.69)	-0.008 (-0.21)
Combo	-0.025 (-1.10)	-0.002 (-0.05)	-0.023 (-1.54)	-0.003 (-0.10)	-0.024 (-1.05)	-0.009 (-0.26)
Relative Size	0.038 (1.39)	0.013 (0.50)	0.004 (0.19)	-0.009 (-0.51)		
Acquirer's Size	0.007 (1.16)	0.002 (0.25)				
Small			0.025** (2.09)	0.030*** (2.75)	-0.002 (-0.13)	0.003 (0.20)
Roadiff	0.003 (0.95)	0.004 (1.19)	0.004* (1.78)	0.005* (1.90)	-0.007 (-0.73)	-0.006 (-0.66)
Target equity-to-assets	-0.176* (-1.72)	-0.371*** (-2.89)	-0.222** (-2.21)	-0.426*** (-3.66)	-0.016 (-0.69)	-0.008 (-0.21)
Target Employees	-0.027* (-1.72)	-0.021 (-1.49)			-0.024 (-1.05)	-0.009 (-0.26)
Small*Target Employees					0.078* (1.92)	0.075* (1.69)
Days to Completion	0.000 (0.18)	0.000 (0.12)	0.000 (0.69)	0.000 (0.62)		
Frequent Bidders	-0.005 (-0.58)	0.004 (0.41)	-0.001 (-0.12)	0.008 (1.03)	-0.002 (-0.23)	0.009 (1.01)
Bid Premium		-0.001** (-2.59)		-0.001*** (-2.85)		-0.001** (-2.46)
N	83	76	83	76	83	76
Adj. R ²	0.012	0.104	0.014	0.138	0.074	0.195

A handful of the remaining control variables bear statistical significant coefficients in the regressions of bidder CARs. Roadiff is significant at 10% in models 3 and 4, 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 models 4-4,



suggesting that banks with high levels of capital are not attractive targets for bidding firms after the DFA. 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. Notably, with the inclusion of the interaction term in models 5 and 6, both Roadiff and Target equity-to-assets lose significance. Lastly, the negative and significant at 1% coefficient for Bid Premium in models 2, 4, and 6 implies that the market regards large premiums as a sign of bidder overpayment (Roll, 1986).³¹ 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 1.2% to 19.5%. This finding, however, is usually observed in bidder abnormal returns regression analyses (see, Cornett and De 1991, and DeLong 2003).

Table 3.6 illustrates the results from the OLS estimations of combined CARs. In line with DeLong and DeYoung (2007), Acquirer's Size is insignificant in both models 1 and 2. The coefficient for Target Employees is also not statistically significant in both model specifications. By contrast, in models 3 and 4, 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 5 and 6, the interaction term of Small Mergers with Target Employees is positive and significant at 1% level in both models. 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 8.9% and 10.9%, respectively. In other words, small bank mergers that allow for

³¹ 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.

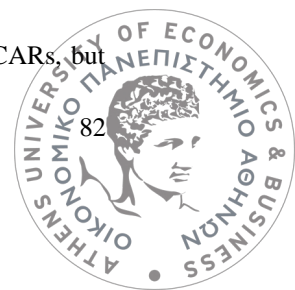


Table 3.6**Regression analysis of combined CARs around the announcement date**

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 the combined three-day CARs, centered on the announcement date. All independent variables are defined in the Appendix (Table 3.1). All continuous variables are winsorized at 2% and 98% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Variables	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Constant	0.053 (0.94)	0.053 (0.89)	0.008 (0.29)	0.029 (0.96)	0.025 (1.07)	0.043 (1.49)
State	0.009 (1.00)	0.007 (0.74)	0.007 (0.80)	0.004 (0.41)	0.004 (0.39)	-0.001 (-0.06)
Stock	-0.006 (-0.29)	-0.010 (-0.39)	-0.010 (-0.67)	-0.013 (-0.64)	-0.007 (-0.39)	-0.013 (-0.49)
Combo	-0.006 (-0.30)	-0.010 (-0.37)	-0.010 (-0.63)	-0.012 (-0.58)	-0.005 (-0.27)	-0.008 (-0.32)
Relative Size	0.060*** (2.76)	0.062*** (2.73)	0.054*** (3.84)	0.050*** (3.24)		
Acquirer's Size	-0.003 (-0.50)	-0.001 (-0.14)				
Small			0.023*** (2.65)	0.024*** (2.66)	0.012 (1.11)	0.010 (0.89)
Roadiff	0.002 (1.04)	0.002 (0.73)	0.003 (1.56)	0.003 (1.19)	0.003 (1.25)	0.003 (1.04)
Target equity-to-assets	-0.124 (-1.17)	-0.221* (-1.95)	-0.154 (-1.52)	-0.257** (-2.43)	-0.183* (-1.77)	-0.287** (-2.43)
Target Employees	-0.010 (-0.92)	-0.011 (-1.05)			0.001 (0.15)	0.002 (0.28)
Small*Target Employees					0.089*** (2.87)	0.109*** (2.97)
Days to Completion	-0.000 (-0.16)	-0.000 (-0.57)	0.000 (0.15)	-0.000 (-0.11)		
Frequent Bidders	-0.002 (-0.28)	0.001 (0.08)	-0.001 (-0.13)	0.004 (0.40)	-0.009 (-0.89)	0.001 (0.15)
Bid Premium		-0.000 (-0.44)		-0.000 (-0.46)		-0.000 (-0.69)
N	83	76	83	76	83	76
Adj. R ²	0.201	0.201	0.227	0.246	0.149	0.219

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 models 1 to 4 (DeLong, 2001). In line with Houston and Ryngaert (1994), Roadiff is insignificant in all model specifications. Finally, contrary to DeLong and DeYoung (2007), we document a significant negative relationship between combined CARs and Target equity-to-assets.

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 of bidder and combined CARs however, Stock and Combo dummy variables bear insignificant coefficients, suggesting that method of payment does not influence bidder and combined firms' announcement abnormal returns.³² 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.

3.6. Robustness checks

As a robustness check, we collect a comparable sample of European bank mergers to investigate whether the documented DFA effect is unique to the U.S. market, since the new legislation impacts only U.S. banks. .

3.6.1. Is there a DFA effect on European bank M&As?

The empirical evidence we have documented so far suggests that the DFA has altered the way the market participants respond to the announcement of small bank mergers. However, it is likely that the observed pattern in abnormal returns relates to the international economic conditions or to the passage of other major regulatory reforms like Basel III. Hence, to assess the stability of our results we re-run the analysis for a sample of European bank M&As, in order to investigate whether the change in market perception for small bank M&As is evident in markets where the DFA is not effective.

In accordance with the U.S. sample, we retrieve merger data for completed European deals from Thomson ONE database. We restrict that both bidders and targets are

³² Results for bidders are consistent with Cornett and De (1991), DeLong (2001), and Becher (2009).



commercial banks or credit institutions located in the European Union (EU-15), Norway and Switzerland. Further, all deals were announced between 1990 and 2014, and the bidder acquired an interest of above 50% in the target firm. In addition, both bidders and targets are listed with available equity returns on Datastream International and accounting data on Worldscope. These criteria yield an initial sample of 120 mergers. From this sample we lose 10 deals due to the fact that equity return data for either the bidder or the target ended before the announcement date. We also eliminate two duplicate listings. Duplicates are defined as instances where the same merger data are listed more than once in the database. Lastly, we verify our remaining merger data against news articles from various sources. We omit 12 deals due to inconsistencies between Thomson ONE data and press coverage.³³ Our final sample consists of 97 completed European bank mergers.

We estimate bidder, target, and combined cumulative abnormal returns over a three-day window centered on the announcement date for the whole sample of mergers. As in Beltratti and Paladino (2013), bidding firms realize an insignificant mean abnormal return in the order of 0.14%. Consistent also with prior studies, target shareholders earn a strong positive mean abnormal return of 8.25%, which is significant at 1% level (Campa and Hernando, 2006; Asimakopoulou and Athanasoglou, 2013). Combined CARs are positive and in the scale of 0.68%, albeit not statistically significant.

To evaluate whether bidder, target, and combined CARs were substantially higher for European small bank mergers in the post-DFA era, we run the difference-in-

³³ For example, Banca Antonveneta S.p.A. is reported as a public firm at the announcement of three acquisitions in the late 1990s. However, the bank became publicly-traded in 2002.



Table 3.7**Difference-in-Differences regression for European bank M&As**

This table summarizes the difference-in-differences regression results for a sample of completed European bank mergers announced between 1990 and 2014. The dependent variable in each regression is the bidder, target or combined three-day CARs centered on the announcement day. All independent variables are defined in the Appendix (Table 3.1). All continuous variables are winsorized at 2% and 98% level. The t-statistics reported in parentheses are clustered by bank. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Variables	Bidder		Target		Combined	
Constant	-0.110 (-1.53)	-0.091 (-1.22)	0.465** (2.22)	0.560** (2.18)	-0.036 (-0.78)	-0.011 (-0.24)
State	0.016 (1.39)	0.016 (1.34)	-0.157*** (-2.90)	-0.172*** (-2.74)	0.007 (0.72)	0.006 (0.56)
Stock	0.008 (0.62)	-0.001 (-0.04)	-0.042 (-0.89)	-0.055 (-1.00)	0.010 (1.14)	0.002 (0.23)
Combo	0.006 (0.38)	-0.002 (-0.10)	-0.069 (-1.40)	-0.082 (-1.42)	0.009 (0.89)	0.001 (0.13)
Relative Size	0.003 (0.16)	-0.007 (-0.38)	-0.065** (-2.17)	-0.082* (-1.94)	-0.002 (-0.18)	-0.012 (-1.10)
Acquirer's Size	0.007 (1.37)	0.006 (0.94)	-0.015 (-1.10)	-0.021 (-1.22)	0.003 (0.72)	0.000 (0.07)
DFA	0.006 (0.38)	0.011 (0.73)	0.000 (0.00)	-0.002 (-0.01)	-0.006 (-0.37)	-0.002 (-0.12)
Small	0.072* (1.83)	0.074* (1.84)	-0.113* (-1.67)	-0.118 (-1.64)	0.011 (0.63)	0.013 (0.72)
DFA*Small	-0.012 (-0.21)	-0.016 (-0.26)	0.215 (1.57)	0.210 (1.49)	0.048 (1.53)	0.044 (1.41)
Target-equity-to-assets		0.028 (0.80)		-0.054 (-0.60)		0.021 (1.14)
Target Employees		0.001 (1.59)		0.001 (0.47)		0.001* (1.86)
Days to Completion	0.000 (0.60)	0.000 (1.04)	-0.000* (-1.81)	-0.000* (-1.78)	0.000 (0.07)	0.000 (0.65)
Frequent Bidders	-0.016 (-1.10)	-0.013 (-0.95)	0.040 (0.79)	0.043 (0.70)	-0.013 (-1.49)	-0.010 (-1.11)
N	97	93	97	93	97	93
Adj. R ²	0.046	0.058	0.145	0.142	0.027	0.069

differences model of equation (5).³⁴ For each dependent variable we run two separate regressions, since data for target firm's common equity and Number of Employees are not available on Worldscope in four cases. As we observe in Table 3.7, the DiD estimator is not significant in any regression model. Similar to the U.S. sample, we run each regression with the examination period starting either from 1995 or 2000.

Results remained unchanged (see Table 3.3 Appendix). We therefore conclude that

³⁴ We do not include Roadiff and Bid Premium in our model specifications, since the inclusion of these variables would severely decrease the number of usable observations without adding much to the explanatory power of our regressions.

the market does not react differently to European small bank mergers after the DFA's enactment. Such findings should strengthen our argument, that the DFA was the main cause of our results for the U.S. banking industry.

3.7. 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 consolidation among banks. In fact, we observe a surge in small bank M&As after the enactment of the DFA. Small banks became significantly more acquisitive after the DFA, since getting larger helps these institutions to cover the costs of complying with the new regulations. On the contrary, merging activity for medium-sized and particularly large banks in the DFA period is considerably lower than in the pre-crisis years.

Next, we present evidence that directly addresses our research question. More precisely, by comparing deals before and after the Act's passage, we document a DFA effect on small bank mergers: At the univariate level, bidder and combined announcement CARs are significantly higher for small banks mergers after the DFA's enactment. To ensure that this difference is not driven by other factors we conduct several Difference-in-Differences regression models. Our results suggest that even after controlling for several bank-and deal-specific characteristics, bidder and combined abnormal returns are significantly higher for small bank mergers in the post-DFA era. Overall, our empirical analysis confirms our prediction that small bank mergers create more shareholder value than before, and we attribute this phenomenon to the passage of the new regulatory regime.



In an effort to investigate the source of this different pattern in abnormal returns, we employ cross-sectional regression models for the 83 mergers of the post-DFA sample. By using the number of target firm's employees as proxy for compliance costs savings, we observe that the DFA effect is even stronger when small merger size meets cost savings opportunities. The sign and magnitude of the remaining control variables are in line with what reported in previous bank M&A studies.

Our results remained stable to a series of robustness test. Given that the DFA applies only to U.S. banks, we repeat the same analysis for a comparable sample of European bank mergers. Hence, if our results for the U.S. sample were driven by other potential influential factors that were common in both markets (e.g. Basel III), we would expect to find a similar market reaction in European mergers over the same period. However, we find no evidence of a similar DFA effect on such deals, and we suggest that the Dodd-Frank Act is the main reason for the change in market perception for U.S. small bank M&As.

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 suggest that the \$10 billion threshold may be 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.



Chapter 4

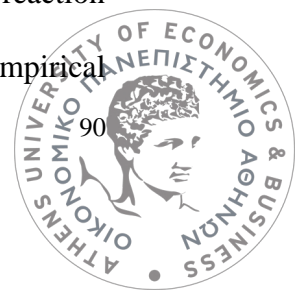
**Is there a listing effect in acquisitions by
U.S. banks? The role of financial advisors**

4.1. Introduction

The U.S. banking industry has experienced intense consolidation in the previous decades. Financial innovation and deregulation fostered successive bank merger waves. However, empirical research fails to provide conclusive evidence that the U.S. bank mergers create value for the bidding firms' shareholders. In fact, Cornett and De (1991), Houston and Ryngaert (1994), DeLong (2001), DeLong and DeYoung (2007), Brewer and Jagtiani (2013), among others, document marginally negative or insignificant market reaction for bidding firms at the merger announcement date. These findings contradict the consensus view, that mergers and acquisitions (M&As) occur for synergies. Notably, all of these studies examine M&As between listed firms, despite the fact that the majority of acquisitions by U.S banks involves unlisted targets.

Motivated by the lack of empirical evidence for bank acquisitions of nonpublic firms, we attempt to shed light on this unexamined issue and investigate whether banks could gain if they choose to acquire unlisted targets. Therefore, we use a large and comprehensive sample of 2,178 M&As of public, privately-held, and subsidiary targets by U.S. banks announced over the period 1984 to 2015. Our initial findings indicate the existence of a “listing effect” in our sample, which is consistent with prior literature on non-financial M&As (Chang, 1998; Fuller et al, 2002; Officer et al., 2009; Netter et al., 2011; Arian and Stulz, 2016; Brander and Egan, 2017): bidders acquiring listed targets achieve negative announcement abnormal returns whereas bidders acquiring stand-alone private companies earn significant abnormal returns upon the merger announcement.

Importantly, when we examined the sources of this difference in market reaction between listed and unlisted bids, we find results that deviate from the empirical



findings in non-financial M&As. Contrary to Chang (1998), Fuller et al. (2002), Officer et al. (2009), and Netter et al. (2011), we do not find empirical support for any method of payment effects for private offers. In fact, when banks acquire private targets, announcement abnormal returns are positive and significant regardless of the method of payment. In addition, results for subsidiary targets do not suggest any difference in market reaction on whether the deal is financed with cash, stock, or a combination of cash and stock. Consequently, our empirical findings do not support the various hypotheses that have been proposed to explain this phenomenon, such as the monitoring activities by target shareholders in equity offers, or the mitigation of the target firm's uncertainty in stock-swap acquisitions.

Next, we examine if the use of a financial advisor on the part of the bidder may contribute to the pattern of abnormal returns in private offers. By definition, uncertainties regarding the valuation of financial firms are fundamentally different than for non-financial firms. Therefore, we hypothesize that the use of a financial advisor may help the acquirer to mitigate the risks from the uncertain valuation of the target firm, especially in private offers, where information regarding the target is not widely available. To test this hypothesis, we collect bidder advisor data for our sample, which restricts the number of useable observations to 1,055. Interestingly, our findings indicate that the use of a financial advisor by the bidding bank has an adverse effect on announcement period returns in public and private offers. More specifically, in public bids, abnormal returns are on average 1.34% lower when the bidding firm employs a financial advisor. By contrast, when bidding banks use financial advisory services in private offers, they experience approximately 2.06% larger average abnormal returns. Results for subsidiary targets are inconclusive. Hence, we conjecture that advisory services are more meaningful in private offers,



since the valuation of the target firm incorporates increased uncertainty. Finally, we test for the effect of the bidder advisor reputation on bidder returns, and we find a negative or at best insignificant relationship between the use top-tier advisors and announcement period returns for all types of mergers (McLaughlin, 1992; Hunter and Jagtiani, 2003; Ismail 2010; Graham et al., 2015).

We also consider the possibility that there could be a bidder-specific driver of acquisition success that can better explain the variation of abnormal returns across the several types of M&As (Golubov et al., 2015). We find that even after the inclusion of bidder fixed effects in our regression analyses, banks that acquire private firms and employ financial advisors enjoy the highest possible abnormal returns. Further, we also control for the possibility that the choice of the target firm is endogenously determined. In order to address this issue, we employ the two-stage procedure outlined by Heckman (1979), and we find that all our results continue to hold after controlling for potential endogenous sample selection.

Our study is related to the extensive literature on the listing effect on non-financial U.S. mergers (Chang, 1998; Fuller et al., 2002; Officer et al., 2009; Netter et al., 2011, Arian and Stulz, 2016). We apply a similar process in a different context- M&As by U.S. banking firms- and find, a significant difference in market reaction between public and nonpublic bids. Further, our study is also related to the literature on the interaction between bidder financial advisors and announcement period gains (Servaes and Zenner, 1996; Hunter and Jagtiani, 2003; Golubov et al., 2012; Graham et al., 2017). Our empirical results indicate that bidding banks could realize positive abnormal returns as long as they acquire privately-held firms, and use financial advisory to resolve potential uncertainties regarding the target firm's valuation.

These findings contradict the consensus view that banks lose upon the announcement



of a merger (Houston and Ryngaert, 1994; DeLong, 2003; Gupta and Misra, 2007, Brewer and Jagtiani, 2013). To the best of our knowledge, this study is the first to examine bank acquisitions under this perspective.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and develops the implications of the prior empirical findings in our study. Section 3 details the data collection for the empirical analysis. Sections 4 and 5 present the univariate and multivariate empirical analysis, respectively. Finally, Section 6 concludes the paper.

4.2. Related background and research questions

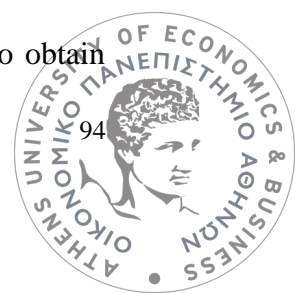
There is a plethora of studies examining the relation between bidder returns and the target firm's listing status in non-financial U.S. M&As. Chang (1998), Fuller et al., (2002), Moeller et al. (2004), Officer et al. (2009) all find positive abnormal returns for acquirers of private firms and subsidiaries. The authors also document a positive relation between bidder returns and equity financing in such deals.

There are several explanations for the larger returns to acquiring firms when the target is unlisted. Chang (1998) suggests that equity offers for private firms tend to create outside blockholders that could serve as effecting monitors of managerial performance. Fuller et al. (2002) document similar results and illustrate tax considerations benefits as an alternative explanation for the higher abnormal returns for stock offers relative to cash offers for private targets. Moeller et al. (2004) outline the importance of the acquiring firm's size in explaining the difference in market reaction between listed and unlisted targets. Acquirers of private targets are more likely to be smaller and pay less for acquisitions than acquirers of public targets. Officer et al. (2009) find a significant positive relation between announcement period

returns and stock financing in difficult-to-value targets, since stock financing is considered to mitigate information asymmetry about the uncertain value of the target firm. In fact, the effect of target-valuation uncertainty is more evident to acquisitions of nonpublic firms, since private firms are more opaque in comparison to publicly traded companies.

Recent empirical work in M&As also documents a significant difference in market reaction between listed and unlisted targets. John et al. (2010) highlight the importance of the target country's investor protection in determining the magnitude of the listing effect on bidder gains. By using a large sample of cross-border acquisitions of public and private firms by U.S. bidders, the authors find that in high investor protection target countries bidder abnormal returns are significantly negative for public targets and significantly positive for private targets. Netter et al. (2011) utilize a large sample of non-financial U.S. acquisitions of both public and private firms, and find comparable results with previous studies: in stock offers, bidders realize the lowest returns when the target is publicly-traded and the highest when the target is a private firm. Arkan and Stulz (2016), show that acquiring firms have better growth opportunities and realize higher announcement returns in acquisitions of nonpublic firms. Brander and Egan (2017) examine acquisition of both public and private firms under the winner's curse perspective. Their findings indicate a stronger winner's curse in public offers, since the proportion of acquiring firms realizing negative announcement returns is substantially higher in such deals.

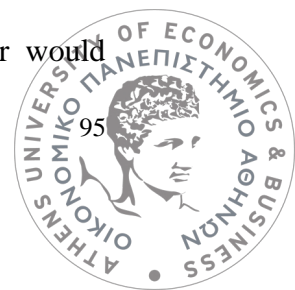
It has been documented in the literature that uncertainty in non-financial M&As constitutes a key element in explaining bidder abnormal returns (Hansen, 1987; Moeller et al., 2007; Officer et al., 2009). In fact, acquirers of more opaque targets experience a larger fraction of total acquisition gains, since they are able to obtain



superior information regarding the target firm's value during the due diligence process (Luypaert and Van Caneghem, 2017). It is therefore likely, that the use of a financial advisor may help the acquiring firm to gather such information and identify potential synergetic opportunities. In fact, one important aspect of the financial advisory services is to ascertain the informationally opaque target value to the acquiring firm. Servaes and Zenner (1996) found that financial advisors are used in more complex transactions that are characterized by significant asymmetric information.

There is a growing literature that examines the relation between financial advisory services and bidder abnormal returns. Bowers and Miller (1990) found that the choice of a financial advisor constitutes an important determinant of merger gains for acquiring firms. In their more recent studies, Ismail (2010) and Graham et al. (2017) suggest that acquiring firms garner higher abnormal returns when they employ non-top-tier financial advisors, rather than large prestigious investment banks. On the other hand, Golubov et al. (2012) document a positive relationship between advisor reputation and bidder CARs, after controlling for selection bias issues.

All the aforementioned studies focus exclusively on non-financial M&As. Therefore, it would be interesting to investigate whether such findings have any application in acquisitions by U.S. banks. In our study, we examine whether banking firms could realize positive abnormal returns by acquiring unlisted firms. In addition, we identify if there is any relation between the use of a financial advisor by the acquiring firm and announcement period gains. It is commonly held that financial firms are inherently more opaque than non-financial firms (Wagner, 2007; Kwan and Carleton, 2010). If we assume that information gathering is indeed meaningful to acquiring firms, then it is reasonable to expect that the use of a financial advisor would



translate to higher bidder abnormal returns, especially in cases where information regarding the target is not widely available.

4.3. Sample and data

We collect merger data from Thomson ONE database. Our sample consists of all successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015.³⁵ We retrieve mergers that meet the following criteria:

1. Bidding firms are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712.
2. The bidder is publicly-traded. The target is a public firm, a private firm, or an unlisted subsidiary of a public firm.
3. All public firms are listed on NYSE, Amex, or Nasdaq.
4. Bidding firms have available return data on the Center for Research in Security Prices (CRSP) for at least five days around the merger announcement and Compustat data for the year-end prior to the merger announcement.
5. The bidder acquired an interest of above 50% in the target firm, raising its interest from below 50% to above 50%.
6. The deal value is disclosed and above \$1 million.

The criteria result in an initial sample of 2,321 M&As, where 817 of the targets were listed on an exchange, 1323 were stand-alone private companies, and 181 were subsidiaries of listed firms. We follow Fuller et al. (2002) and we exclude from the

³⁵ Barnes et al. (2014) suggest that Thomson ONE data (former SDC) are reliable from 1984 and onward while early 1980s are not recommended for research.

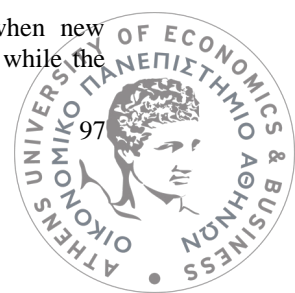


sample 110 clustered mergers, where the bidding bank acquired more than one target firms within 5 days, in order to isolate the bidder's abnormal return for a specific merger (24 public targets, 79 private targets, and 7 subsidiary targets). We further eliminate 5 duplicate listings from the sample (1 public target, 4 private targets). Duplicates are defined as instances where the same bidder, target and announcement date are listed more than once in the Thomson ONE database.³⁶ Similar to Vallascas and Hagendorff (2011), we also exclude 20 mergers which involved failing institutions, as reported by Thomson ONE (2 public targets, 15 private targets, 3 subsidiary targets). Finally, we exclude 8 mergers where data for the method of payment are not available (6 private targets, 2 subsidiary targets). Our final sample consists of 2,178 mergers, where 790 of the targets were listed firms, 1,219 were private companies, and 169 were unlisted subsidiaries of listed firms.

4.3.1. Sample statistics

Table 4.1 shows the inflation-adjusted (base 2015 dollars) mean value of transaction and the number of mergers per year. The merger sample is segmented based on the target firm's listing status. Evidently, the number and size of M&As do not increase monotonically through time in each category. Initially, we observe a sharp increase in merger activity in the 1990s, for all three types of mergers. This increase is consistent with Mitchell and Mulherin (1996), who document that the deregulation wave of the 1990s has spurred intense consolidation in the U.S. banking industry. In the new millennium, merger activity experienced a downward trend, and did not peak until the mid 2000s. The 2008 financial crisis led to a further dramatic decrease in the level of banking consolidation. However, in the most recent years, U.S. bank

³⁶ Duplicates emerge from errors in updating Thomson ONE data. In these cases, when new information is available for a M&A transaction, a new record is created in the database while the previous one still exists.



M&A activity exhibits an increasing trend, following the passage of the Dodd-Frank Act (Leledakis and Pyrgiotakis, 2016).

Table 4.2 reports the distribution of our merger sample by target firm's industry affiliation, using 48-industry classifications from Fama and French (1997). Industries definitions are based on the four-digit primary SIC codes.³⁷ We report by industry the number of banks making successful bids for all types of targets, and we further divide the sample based on the target firm's listing status. Interestingly, almost the whole sample (98.62%) involves targets within the financial industry, whereas the vast majority of deals (89.39%) are limited to bank-to-bank mergers.

Table 4.3 provides additional data describing the sample. Panel A reports the mean and median values for deal-specific characteristics of our sample. Transaction value is the total amount of consideration paid by the bidding bank excluding fees and expenses (in 2015 million \$). Not surprisingly, the dollar value of M&As is much larger for listed targets than private or subsidiary targets. Notably, mergers involving public targets are approximately 22 times larger compared to mergers involving private targets. Days to completion is the number of calendar days between the announcement and effective dates, and serves as a proxy for merger complexity. The length of a merger is larger for deals involving public targets than for deals involving unlisted firms, suggesting that as mergers get larger and more complex, the time to close a deal increases. Following Martin (1996), we group the method of payment into three different categories: (1) Cash payments include combinations of cash, debt, or liabilities. (2) Stock payments include financing with common stock or combinations of common and options or warrants. (3) Combo financing includes

³⁷ Primary SIC codes denote the primary line of business for a company. However, up to ten different SIC codes may be assigned to each firm, based on the lines of business the company is involved. Therefore, a target firm in our sample may be characterized a bank by its primary SIC code, but it could also engage in trading, insurance, or real estate activities.

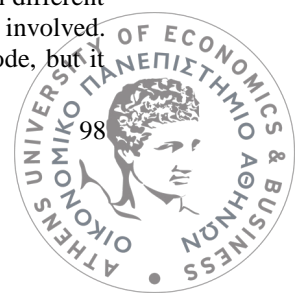


Table 4.1**Merger size by announcement year and target firm's listing status.**

This table contains means for the total value of consideration paid by the bidder, excluding fees and expenses, segmented by year and target firm's listing status. All values are adjusted for inflation (in 2015 million \$). The sample consists of all successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. Bidders are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712. Targets are comprised of publicly traded, privately-held firms, and unlisted subsidiaries of publicly traded firms. Merger data are collected from Thomson ONE database.

Year	All		Public		Private		Subsidiary	
	Mean	N	Mean	N	Mean	N	Mean	N
1984	88.307	28	429.613	3	47.851	24	35.34	1
1985	352.382	20	756.003	8	90.589	10	46.86	2
1986	314.209	44	990.255	10	92.047	31	356.4	3
1987	380.896	52	1,067.29	16	64.141	33	204.437	3
1988	188.433	24	529.703	6	61.128	17	305	1
1989	222.874	55	549.955	18	39.801	32	217.052	5
1990	143.769	35	64.556	8	74.228	23	702.054	4
1991	580.61	56	1,219.65	25	38.74	23	141.477	8
1992	256.583	70	437.778	32	97.507	33	146.834	5
1993	176.325	133	420.435	42	54.932	77	111.655	14
1994	142.474	162	330.703	50	53.985	99	92.399	13
1995	628.09	122	1,486.20	50	29.615	63	50.152	9
1996	294.718	105	714.209	34	58.584	66	559.153	5
1997	911.925	153	2,525.90	48	83.744	90	716.303	15
1998	1,316.581	144	3,892.70	46	76.029	88	383.322	10
1999	517.509	101	1,057.70	45	56.727	48	243.606	8
2000	1,083.804	75	1,972.67	38	47.626	32	959.932	5
2001	405.048	75	872.118	28	56.25	41	608.833	6
2002	329.798	48	612.72	17	39.503	25	737.744	6
2003	1070.27	87	2,279.31	35	54.819	43	1,220.05	9
2004	1,353.785	100	3,092.06	42	64.876	48	239.814	10
2005	800.856	85	2,643.28	22	146.115	61	503.807	2
2006	1,254.437	71	3,390.29	23	70.395	44	1,997.73	4
2007	378.862	62	746.984	27	90.926	32	137.086	3
2008	3,674.209	23	5,225.92	16	127.439	7	0	0
2009	213.396	11	113.747	5	10.936	3	581.937	3
2010	393.381	20	403.162	12	18.59	4	738.829	4
2011	105.434	20	170.743	8	35.319	10	194.775	2
2012	252.622	31	419.317	16	74.815	15	0	0
2013	206.434	46	339.411	18	103.108	25	269.62	3
2014	140.399	62	254.808	24	64.39	37	206.9	1
2015	285.285	58	602.002	18	63.555	35	697.217	5
Total	609.250	2,178	1,479.740	790	67.497	1,219	447.776	169

Table 4.2**Merger Activity by target firm's**

This table reports, by industry of the target firm, the fraction of sample firms that were acquired from 1984 to 2015. Bidders are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712. Targets are comprised of publicly traded, privately-held firms, and unlisted subsidiaries of publicly traded firms. Target industry data are organized following Fama and French (1997) 48-industry classifications, using four-digit Primary SIC codes. Merger data are obtained from Thomson ONE database.

Target Industry	All	Public	Private	Subsidiary
Machinery	1	0	1	0
Personal Services	1	1	0	0
Business Services	27	5	15	7
Retail	1	0	0	1
Banking	1,947	730	1,078	139
Insurance	18	0	17	1
Real Estate	3	0	2	1
Trading	180	54	106	20
Total	2,178	790	1,219	169

combinations of cash, common stock, debt, preferred stock, convertible securities and methods classified as “Other consideration” by Thomson ONE database. We observe that stock financing is the prevailing method of payment for acquisitions of public and private targets, whereas in the case of subsidiary targets, bidding banks prefer to pay with cash. Lastly, geographical focus is expressed by the percentage of the same state deals.

Panel B of Table 4.3 reports the mean and median values for bidder-specific characteristics. We provide data on the bidding firm's size (total assets and market value of equity) and profitability. In line with the literature on non-financial firms, the average bidder of public targets is larger compared to the average bidder of private targets. Average bidder profitability, as measured by return on assets (ROA) is 1.04, 1.07, and 0.99 for listed, private and subsidiary targets, respectively.



Table 4.3**Summary statistics by target firm's listing status.**

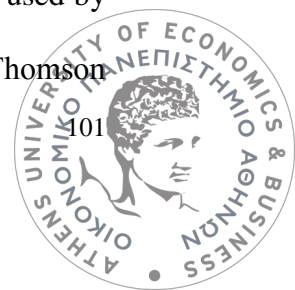
This table summarizes descriptive statistics for all M&As of our sample, segmented by the target firm's listing status. The sample consists of all successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. Bidders are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712. Targets are comprised of publicly traded, privately-held firms, and unlisted subsidiaries of publicly traded firms. Panel A displays statistics for deal-specific variables. The transaction value is the total value of consideration paid by the bidder, excluding fees and expenses (in 2015 million \$). Days to completion measures the calendar days between the announcement and effective dates. The percentages of cash, stock, and combo deals represent the method of payment. Geographic diversification is measured by the percentage of same state deals. The percentage of pooling method denotes the mergers that use the pooling method versus the purchase method to incorporate the target into the bidding firm's books. The percentage of single bidders denotes the percentage of deals where the target firm received only one bid. Target's equity percentages acquired and owned represent the proportion of target's equity the bidder acquired in the transaction and owned after the transaction, respectively. Panel B details statistics for bidder-specific variables. Total Assets are the bidding firm's total assets at year-end prior to the merger announcement (in 2015 million \$). Market Value is the bidding firm's market capitalization at year-end prior to the merger announcement (in 2015 million \$). ROA is the bidding firm's return on assets at year-end prior to the merger announcement. Median values are in brackets.

	All	Public	Private	Subsidiary
Panel A: Deal characteristics				
Transaction value (million \$)	609.25 [60.72]	1,479.74 [203.71]	67.50 [32.56]	447.78 [86.92]
Days to completion	170.79 [161.00]	191.84 [175.00]	162.79 [151.00]	130.08 [123.00]
% of cash deals	25.67	11.39	27.73	77.51
% of stock deals	48.53	59.11	47.17	8.88
% of combo deals	25.80	29.50	25.10	13.61
% same state deals	48.53	45.44	52.09	37.28
% pooling method	21.63	27.97	20.26	1.78
% single bidders	98.86	98.10	99.92	100
% Target's equity acquired in transaction	99.66	99.66	99.64	99.79
% Target's equity owned after transaction	99.79	99.85	99.74	99.79
Panel B: Bidder characteristics				
Total assets (million \$)	46,137.81 [7,515.37]	57,244.15 [13,450.43]	18,578.80 [4,634.35]	192,939.30 [27,918.38]
Market value of equity (million \$)	7,3668.55 [1,091.23]	9,965.42 [2,129]	2,853.78 [707.07]	27,794.48 [3,387.48]
ROA	1.05 [1.04]	1.04 [1.06]	1.07 [1.04]	0.99 [1.00]

4.3.2. Financial advisor data

In order to test the relation between bidder abnormal returns and financial advisory services we download financial advisor data for the bidding banks of our sample.

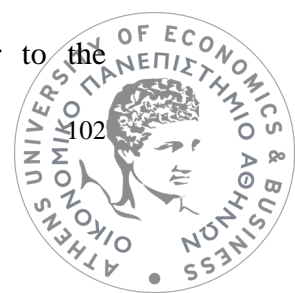
More precisely, we collect information on whether or not any advisors were used by the bidding firm, number of advisors used and advisor's full name, from Thomson



ONE database. For our whole sample of 2,178 M&As, we identified 1,055 mergers with complete information about bidder financial advisors (540 public targets, 443 private targets, and 72 subsidiary targets). Out of the 1,055 sampled deals, 861 were advised by at least one investment bank, and 194 deals did not involve any financial advisors on the part of the bidder (in-house deals).

We also control for the financial advisor's reputation, to test whether top-tier investment banks are perceived to provide better services in bank acquirers than non-top-tier advisors. Hence, we download financial advisors league tables from Thomson ONE database for deals announced and completed during the period January 1984 to December 2015. Table 4.4 presents financial advisor rankings according to the dollar value of transaction handled by the advisor during the sample period. Interestingly, the top-11 advisors are the same in both announced and completed deals' rankings. Following Fang (2005), we classify advisors into two tiers: the top-8 investment banks are defined as "top-tier" and all other financial advisors as "non-top-tier". The use of this binary classification is preferable econometrically, since the use of a continuous variable would imply that the separate tiers should have a constant effect on bidder abnormal returns. The top-8 financial advisors are: Goldman Sachs & Co, Morgan Stanley, Bank of America Merrill Lynch, JP Morgan, Citi, Credit Suisse, Barclays, and Lazard. Most of these investment banks appear in league tables of prior studies (Rau, 2000; Hunter and Jagtiani, 2003; Golubov et al., 2012). Hence, we suggest that financial advisors' reputation is relatively stable overtime.

In order to correctly assign the reputation of each financial advisor, we follow Golubov et al. (2012), and we account for the M&As between financial advisors. For example, Bank of America was not a top-tier financial advisor prior to the



acquisition of Merrill Lynch in 2008. Hence, mergers advised by Bank of America before 2008 are classified as advised by a non- top-tier financial advisor. Finally, in case a bidding bank had employed multiple financial advisors, the deal is classified as advised by a top-tier advisor if at least one of the advisors belongs to the top-8 group (Servaes and Zenner, 1996).

4.4. Univariate Analysis

We use the standard event study methodology, outlined by Brown and Warner (1985), to evaluate bidder gains around the merger announcement dates. We estimate cumulative abnormal returns (CARs) over a five-day event window, centered on the announcement date (-2, +2) using the market adjusted return model:³⁸

$$AR_{i,t} = R_{i,t} - R_{m,t}$$

Where $R_{i,t}$ is the return for stock i on day t and $R_{m,t}$ is the market return on the CRSP NYSE/Amex/Nasdaq value-weighted index on day t . We do not estimate market model parameters over a time interval prior to the merger announcement to account for the possibility that a bidding bank had announced another merger at some point during the estimation period (Fuller et al., 2002).³⁹ We evaluate the statistical significance of our results based on the standardized cross-section test of Boehmer et al. (1991). This procedure corrects for potential increases in the variance of abnormal

³⁸ We also examined other event windows frequently used in the literature (-1, +1), (-5, +1), (-10, +1), (-10, +10), (-1, +10), (-30,+5). Results remained qualitatively similar.

³⁹ To ensure robustness of our results we have also estimated CARs using the market model and the mean adjusted returns model. Results remained unchanged.

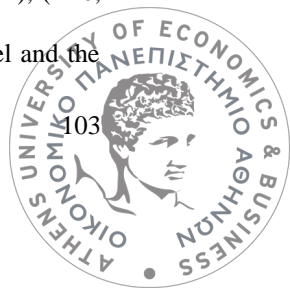


Table 4.4**Top-25 financial advisors ranked by transaction value**

The table illustrates the top-25 financial advisor rankings over the period 1984 to 2015. The financial advisors are ranked based on the transaction value of deals they advised for a sample of M&As targeting U.S. firms. Transaction value is the total consideration paid for the target minus any liabilities assumed in transaction plus the target firm's net debt (in \$ millions). Credit is allocated to surviving/parent firms and to each eligible advisor in case of multiple advisors for a single entity. We exclude equity carve-outs, exchange offers, and open market repurchases.

Announced Transactions				Completed Transactions			
Rank	Financial Advisor	Transaction Value	Number of Deals	Rank	Financial Advisor	Transaction Value	Number of Deals
Top-Tier Financial Advisors							
1	Goldman Sachs & Co	9,171,621.71	5,170	1	Goldman Sachs & Co	8,696,073.32	5,046
2	Morgan Stanley	7,056,243.57	4,226	2	Morgan Stanley	6,595,234.87	4,163
3	Bank of America Merrill Lynch	6,681,615.86	5,499	3	Bank of America Merrill Lynch	6,316,775.23	5,387
4	JP Morgan	6,520,060.41	4,908	4	JP Morgan	6,211,820.40	4,818
5	Citi	5,419,015.57	4,782	5	Citi	5,061,962.47	4,714
6	Credit Suisse	4,937,269.24	5,364	6	Credit Suisse	4,589,817.29	5,305
7	Barclays	4,384,337.67	3,295	7	Barclays	4,082,195.80	3,254
8	Lazard	2,814,979.35	2,252	8	Lazard	2,572,256.75	2,191
Non-Top-Tier Financial Advisors							
9	UBS	2,623,536.10	3,265	9	UBS	2,438,392.08	3,252
10	Deutsche Bank	2,183,201.29	2,386	10	Deutsche Bank	1,995,843.37	2,357
11	Evercore Partners	1,511,295.59	643	11	Evercore Partners	1,264,683.56	599
12	Centerview Partners LLC	867,383.97	178	12	Commerzbank AG	726,901.29	543
13	Commerzbank AG	727,171.74	552	13	Wells Fargo & Co	697,188.30	1,152
14	Wells Fargo & Co	713,205.85	1,181	14	PJT Partners Inc	652,395.47	443
15	PJT Partners Inc	681,484.22	467	15	Centerview Partners LLC	649,428.79	152
16	Houlihan Lokey	642,340.07	2,686	16	Houlihan Lokey	637,600.67	2,578
17	Jefferies LLC	607,868.26	1,981	17	Jefferies LLC	594,458.62	1,940
18	Greenhill & Co, LLC	527,069.08	270	18	Greenhill & Co, LLC	469,317.48	252
19	RBC Capital Markets	494,477.80	1,713	19	Rothschild & Co	443,360.89	544
20	Rothschild & Co	483,153.12	562	20	Stifel/KBW	417,217.82	1,769
21	Moelis & Co	437,554.50	498	21	RBC Capital Markets	413,838.82	1,672
22	Stifel/KBW	423,166.65	1,818	22	Moelis & Co	340,036.21	465
23	Allen & Co Inc	403,219.73	187	23	Allen & Co Inc	318,107.71	184
24	Guggenheim Securities LLC	373,673.24	88	24	BNP Paribas SA	241,047.45	103
25	BNP Paribas SA	272,742.58	107	25	Guggenheim Securities LLC	237,546.10	80

returns, commonly found in event studies. Further, to account for the non-normal distribution of the security returns, we test the statistical significance of the median values by using the Wilcoxon signed-rank test.

Table 4.5 presents the mean CARs for bidding banks classified by the target firm's listing status and method of payment. The first column of Table 4.5 reports CARs for the full sample of bidders. Consistent with prior empirical findings, bidding banks realize negative abnormal returns upon the announcement of a merger. However, when we differentiate returns based on the method of payment we observe that cash offers experience insignificant results, whereas mergers financed with any type of stock realize statistically negative abnormal returns. Segmenting by the type of the target firm, we are able to extract more conclusive results. In public bids, the average abnormal return for bidding firms is -1.45% , and statistical significant at 1% level (Cornett and De, 1991; Houston and Ryngaert, 1997; DeLong and DeYoung, 2007). Again, returns for the cash offers are indistinguishable for zero. However, in stock or combination offers, abnormal returns are negative and significant in the scale of -1.61% and -1.63% , respectively. The median abnormal returns for these deals are -1.37% and -1.64% , respectively, and the Wilcoxon signed-rank test is significant in both cases. Therefore, in public bank M&As, equity offers translate to a negative market reaction (Travlos, 1987). On the contrary, in private bids, the average bidding bank earns a 0.58% abnormal return, which is statistical significant at 1% level. These results suggest that bidders of privately held targets experience approximately 2.03% larger abnormal returns compared to bidders of publicly traded targets, on average. This difference is statistical significant at 1% level ($t=9.84$). Interestingly, in private offers, bidder abnormal returns are positive and significant regardless of the method of payment: cash (0.61%), stock (0.56%), and combination (0.57%).



Medians are significant in all cases except from equity offers. In the case of subsidiary targets, the bidders CARs are insignificant for all groups. However, the difference in market reaction between public and subsidiary offers is also significant at 1% ($t=4.17$). Overall, our results support the existence of a “listing effect” in M&As between U.S. banks and domestic unlisted targets. Henceforth, in our discussion of results, we focus on mean CARs, since mean and median CARs tell the same story.

4.4.1. Explanations of the listing effect in bidder CARs

The majority of the U.S. studies that examine the listing effect in M&As attribute the difference in market reaction between public and private bids to method of payment effects. The monitoring hypothesis outlined by Chang (1998), suggests that acquisitions of closely-held private firms result in the creation of outside blockholders that act as effective monitors of acquirer’s managerial performance. Consequently, when bidding firms pay with common stock for private targets, they experience a positive revaluation of their share price. Fuller et al. (2002) document that equity offers in private bids could result in more positive abnormal returns, since the shareholders of the target firm would share any potential risks from overvaluation. Accordingly, Officer et al. (2009) demonstrate that stock offers for difficult-to-value targets translate to positive bidder announcement returns in acquisitions of unlisted targets. Apparently, all these hypotheses predict that, in acquisitions of privately-held targets, bidder CARs should be significantly larger when firms pay with stock instead of cash. Our results however, are inconsistent with these findings. In particular, bidding banks realize positive abnormal returns in private offers, irrespective of the method of payment (differences across subsamples of private targets are insignificant). Furthermore, in the case of subsidiary targets,



abnormal returns do not differ for cash, equity, or mixed offers. Hence, we posit that the traditional explanations for the listing effect do not account for the difference in market reaction between listed and unlisted targets, for bank acquirers. For example, the monitoring hypothesis, one of the most common explanations for the listing effect is non-financial U.S. mergers, assumes that private firms are family-owned or closely-held. However, in our sample, Thomson ONE reports only 3 cases where private target firms were family-owned.⁴⁰ It is therefore unlikely that the ownership structure of the target firm would have a monitoring effect in the case of M&As by U.S. banks.

One alternative explanation for the listing effect assumes limited competition for the privately-held targets, due to the higher costs of obtaining accurate information. In a limited competition environment, bidders may realize positive abnormal returns, since the likelihood of underpayment is higher (Chang, 1998). In addition, James and Wier (1987), Cornett and De (1991), and others, document that the number of bids per target firm (proxy for competition) relates to statistically lower announcement returns, since the winning firm might overpay to win the bidding war. However, as shown in Table 4.3, the vast majority of target firms receive only one public bid: public targets (98.10%), private targets (99.92%), subsidiary targets (100%). Hence, bidding banks face almost no competition in acquiring either listed or unlisted targets. It is therefore unlikely that the limited competition hypothesis can explain the listing effect in M&As by U.S. banking firms.

⁴⁰ A target is characterized as “family-owned” if at least a family, a group of families, or a non-founding chairman controls 20% of the firm.



Table 4.5**Bidder cumulative abnormal returns around the announcement date**

This table illustrates the bidder announcement cumulative abnormal returns. The sample consists of all successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. Bidders are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712. Targets are comprised of publicly traded, privately-held firms, and unlisted subsidiaries of publicly traded firms. Abnormal returns are estimated using the market adjusted returns model for a five-day event window centered on the announcement date (-2, +2). Results are further segmented according to the method of payment. Cash financing includes combination of cash, debt, and liabilities. Stock financing includes payments with common stock and combinations of common stock, warrants, or options. Combo financing includes combination of cash, common stock, debt, preferred stock, convertible securities, and methods classified as “other consideration” by Thomson ONE database. The median CARs are in brackets and the number of mergers is below the medians. The parametric test is the standardized cross-sectional test, and the non-parametric is the Wilcoxon signed rank test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	All	Public	Private	Subsidiary
All bids	-0.18% *** [-0.36%] *** 2,178	-1.45% *** [-1.34%] *** 790	0.58% *** [0.21%] *** 1,219	0.31% [-0.32%] 169
Cash	0.43% [0.11%] 559	-0.18% [0.12%] 90	0.61% ** [0.27%] ** 338	0.41% [-0.31%] 131
Stock	-0.43% *** [-0.51%] *** 1,057	-1.61% *** [-1.37%] *** 467	0.56% ** [0.05%] 575	-1.42% [0.21%] 15
Combo	-0.33% *** [-0.46%] ** 562	-1.63% *** [-1.64%] *** 233	0.57% ** [0.29%] * 306	0.92% [-0.58%] 23

Another strand of the M&As literature suggests that merger gains may be capitalized before the official merger announcement. For example, Schipper and Thomson (1983) find significant bidder gains in the pre-acquisition period, and attribute their findings to potential leakage of information. In this case, measuring abnormal returns at the announcement date may underestimate the market reaction for the transaction, since such leakage would show-up in the pre-announcement bidder returns. Hypothetically, this is a more likely scenario in deals than involve two listed firms, where information regarding the merging firms is more widely available, than in acquisitions of unlisted firms. Hence, the difference in announcement abnormal returns between listed and unlisted bids may not reflect a difference in wealth



creation, since merger gains for public offers might have been ex-ante capitalized and impounded in the stock price. To account for this possibility, we examine if there is a run-up in the bidding firm's stock price, emanating from any potential leakage of information regarding the acquisition. Following Faccio et al. (2006) we compute pre-announcement abnormal returns over the window $(-15, -3)$. Over this interval, abnormal returns are positive for all types of mergers, but significant only for the private offers. More precisely, bidder CARs are: 0.10% for public targets, 0.46% for private targets, and 0.63% for subsidiary targets. Therefore, these results are inconsistent with the assumption that prior capitalization of merger gains accounts for the listing effect in our sample.⁴¹

4.4.2. *Regulatory effects on bidder CARs*

The U.S. banking industry is accustomed to legislative tsunamis. Federal legislations usually incorporate several regulations governing bank merger activity. Prior studies have outlined the important effect of regulatory changes on merger wealth gains (Carow and Heron, 1998; Becher, 2000, 2009; Filson and Olfatti, 2014; Leledakis and Pyrgiotakis, 2016). Therefore, we test whether these legislative changes could explain the difference in market reaction between public and nonpublic bids.

During our sample period, four consecutive pieces of federal legislation made substantial changes in the permissible bank merger activity. Initially, the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA), allowed commercial banks to acquire failed thrift institutions. The Riegle-Neal Interstate Branching and Efficiency Act of 1994 eliminated all restrictions to interstate branching, and enabled banks to expand nationwide through M&As. Furthermore,

⁴¹ We also examine deals that began as a rumor. Thomson ONE identifies a rumor for possible acquisition for 26, 9, and 8 acquisitions of public, private, and subsidiary targets, respectively. Given the small number of deals in each category, it is quite unlikely that rumors of acquisitions could explain the listing effect in our sample.

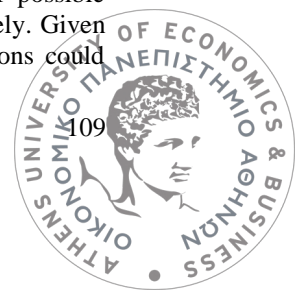


Table 4.6**Bidder cumulative abnormal returns by regulatory period**

This table illustrates the bidder announcement cumulative abnormal returns for each regulatory period. The sample consists of all successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. Bidders are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712. Targets are comprised of publicly traded, privately-held firms, and unlisted subsidiaries of publicly traded firms. Results are segmented based on the different regulatory periods. FIRREA refers to the Financial Institutions Reform, Recovery and Enforcement Act of 1989. Riegle-Neal is the Riegle-Neal Interstate Branching and Efficiency Act of 1994. GLBA refers to the Gramm-Leach-Bliley Financial Modernization Act of 1999. DFA refers to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. Regulatory periods are classified according to the dates when provisions of each piece of legislation became effective. Abnormal returns are estimated using the market adjusted returns model for a five-day event window centered on the announcement date (-2, +2). The median CARs are in brackets and the number of mergers is below the medians. The parametric test is the standardized cross-sectional test, and the non-parametric is the Wilcoxon signed rank test. Significance for the difference between mean CARs is based on the *t*-test. Significance for the difference between median CARs is based on the Mann-Whitney test (in brackets). The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	All	Public	Private	Subsidiary	Difference Private- Public	Difference Subsidiary- Public
Pre-FIRREA	-1.06%*** [-0.69%]*** 198	-2.80%*** [-2.71%]*** 52	-0.46% [-0.36%] 133	-0.28% [1.01%] 13	2.33%*** [2.35%]***	2.52%* [3.72%]*
FIRREA	-0.16%** [-0.19%] 756	-1.32%*** [-1.26%]*** 269	0.56%*** [0.50%]*** 423	-0.03% [-0.09%] 64	1.88%*** [1.76%]***	1.30%** [1.17%]**
Riegle-Neal	-0.84%*** [-0.87%]*** 359	-2.83%*** [-2.60%]*** 126	0.30% [-0.31%] 204	-0.24% [-0.22%] 29	3.13%*** [2.29%]***	2.59%*** [2.38%]***
GLBA	0.10%** [-0.52%]* 635	-1.00%*** [-1.05%]*** 250	0.76% [0.02%] 335	1.15% [-0.53%] 50	1.76%*** [1.07%]***	2.15%** [0.52%]*
Dodd-Frank	0.79%*** [0.50%]** 230	-0.41% [-0.44%] 93	1.71%*** [1.23%]*** 124	0.61% [-0.64%] 13	2.10%*** [1.67%]***	1.00% [-0.20%]

the Gramm-Leach-Bliley Financial Modernization Act of 1999 (GLBA) effectively removed all the barriers that prohibited commercial banks from expanding into the securities and insurance industries. On the contrary, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (DFA) raised the barriers to completing merger transactions, and imposed stricter concentration limits to prevent

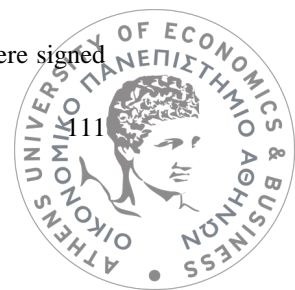


future consolidation among large, systemically important financial institutions.

We follow Gupta and Misra (2007), and we disaggregate our sample in separate regulatory periods, according to the dates when provisions of each piece of legislation became effective:⁴² Pre-FIRREA period (January 1984 to September 1989), FIRREA period (October 1989 to June 1997), Riegle-Neal period (July 1997 to March 2000), Gramm-Leach-Bliley period (April 2000 to June 2010), and Dodd-Frank period (July 2010 to December 2015).

Table 4.6 summarizes bidder abnormal returns for different regulatory periods, segmented by the target firm's listing status. For the whole sample of mergers, we observe that returns vary significantly across regulatory periods. More specifically, mean CARs are negative and significant in the Pre-FIRREA, FIRREA, and Riegle-Neal periods, while in the Gramm-Leach-Bliley period, bidding banks realize a mean abnormal return of 0.10%, which is statistical significant at 5%. After the enactment of the Dodd-Frank Act, bidders experience significant wealth gains, in the scale of 0.79%, on average (Leledakis and Pyrgiotakis, 2016). For public bids, results are consistent with prior U.S. bank M&As studies: bidder CARs are negative and significant at 1% level, ranging from -2.80% in the pre-FIRREA period to -1.00% in the GLBA period. In the Dodd-Frank period however, abnormal returns for bidding banks are indistinguishable from zero. For private offers, abnormal returns are positive in all but the pre-FIRREA period, but significant only in the FIRREA and DFA periods. Results for subsidiary targets are insignificant, regardless of the regulatory changes.

⁴² Alternatively, we classified the sample according to the dates the separate legislations were signed into law. Results were qualitatively similar.



These results indicate that legislative changes could have a significant impact on bidder abnormal returns. However, we are mostly interested in examining whether the difference in market reaction between public and nonpublic bids persists across regulatory periods. The last two columns of Table 4.6 report the differences between the means and medians for private and public targets, and subsidiary and public targets, respectively.⁴³ Our results indicate that bidder abnormal returns are larger for private and subsidiary targets than for public targets for all regulatory periods, and the magnitude of these differences does not vary substantially overtime. In terms of statistical significance, differences between means and medians for private and public targets are significant at 1% level in all regulatory periods. For subsidiary targets, differences are abnormal returns significant in all but the DFA period. Thus, the interpretation of these results is that the listing effect persists through time and is not due to any legislative changes in the U.S. banking industry.

4.4.3. CARs at the completion date

All the prior empirical work we have documented so far focuses on announcement period returns, implying that all expected price reactions should occur at the announcement of a bid. However, in practice, not all announced mergers are finally completed. An important feature of the financial sector is that regulatory approval is mandatory for the completion of a transaction. Regulators may reject an application if the acquisition does not satisfy the public benefit criteria, or exceed several concentration limits (Desai and Stover, 1983).

It is therefore likely that the probability of success may influence the market reaction upon the announcement of a proposed merger. In fact, the uncertain outcome may

⁴³ Significance for the difference between mean CARs and median CARs is based on the *t*-test and on the Mann-Whitney test, respectively.



induce investors to postpone their reaction at a time where the bidder intention to acquire is indeed materialized. We explore whether the likelihood of an acquisition success is higher for unlisted targets than for listed targets. In this case, the announcement abnormal returns for the public bids could be downward biased compared to the returns for private bids. However, abnormal returns at the deal completion date may be higher for public than for private bids. As a result, the listing effect in announcement period gains may be explained by a difference in the proportion of successful acquisitions between the separate types of targets.

We base the assumption of a different probability in acquisition success for listed and unlisted target on two main arguments. Firstly, the Williams Act of 1968 mandates information disclosure and waiting periods for acquisitions of publicly-traded firms, whereas such requirements are not applicable to acquisitions of privately-held firms. Hence, acquisitions of private targets may be announced when completed (Officer et al., 2009). Secondly, acquisitions of public firms are typically larger, suggesting that regulatory approval is a less likely scenario.

In the spirit of Faccio et al. (2006), we identify acquisitions that were announced as completed transactions at the initial announcement date. From our whole sample of 2,178 M&As, only 79 deals were announced when completed (1 public target, 64 private targets, 14 subsidiary targets). Thus, for the remaining 2,099 deals there was uncertainty regarding the successful completion of the proposed transaction (789 public targets, 1,155 private targets, 155 subsidiary targets). Further, we identified 206 M&As that were announced but not completed during the examination period (103 public targets, 96 private targets, 7 subsidiary targets). Accordingly, the probability of success for a public bid is $(789/(789+103))= 88.45\%$, the probability of success for a private bid is $(1,155/(1,155+96))= 92.33\%$, and the probability of



success for a subsidiary bid is $(155/(155+7))= 95.68\%$. Consistent with our prediction, the probability of a successful acquisition in the case of a listed target is smaller relative to an unlisted target, albeit the differences are small.

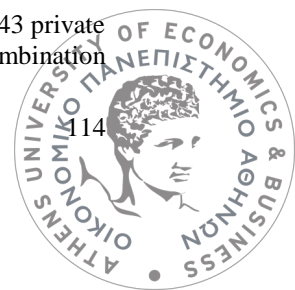
At last, we examine whether these differences in acquisition success probabilities translate into differences in bidder abnormal returns at deal completion dates. In line with announcement period returns, we estimate bidder CARs over a five-day window, centered on the completion date. We include in the analysis only the bidders of the 2,099 M&As in which there was uncertainty about the success of the acquisition.⁴⁴ In fact, CARs are positive for all types of mergers, but significant only for public offers. More specifically, bidder completion CARs are: 0.32% for public targets, 0.10% for private targets, and 0.47% for subsidiary targets. These results indicate that market participants do indeed reward bidding banks when they complete an acquisition of a public firm. However, differences between public and private offers, and public and subsidiary offers are insignificant, suggesting that the market reaction at the deal completion date does not offset the difference in market reaction between listed and unlisted targets at the announcement of such bids.

4.4.4. The role of financial advisors

Panel A of Table 4.7 presents the bidder CARs for the sample of the 1,055 M&As, segmenting by the target firm's listing status. Apparently, the results are consistent with the listing effect analyzed previously in this section, since bidder CARs in acquisitions of unlisted targets are significantly larger than in acquisition of listed targets.⁴⁵ In Panel B we partition the sample based on whether or not the bidding banks had used a financial advisor. For the whole sample of 1,055 mergers we find

⁴⁴ Results were qualitatively similar for the whole sample of 2,178 M&As

⁴⁵ In addition, the method of payment does not influence bidder CARs in the subsample of 443 private offers. In particular, bidder CARs are 0.84%, 0.74%, and 1.13%, for cash, stock, and combination offers, respectively.



that the use of an advisor does not affect announcement abnormal returns, since returns in both cases are negative and significant but their difference is not statistical significant (Servaes and Zenner, 1996). However, by segmenting again based on the target firm's listing status we are able to extract more conclusive results. In particular, in-house deals for public offers produce insignificant abnormal returns, whereas when an advisor is used, public bids experience a mean abnormal return in the scale of -1.90% , which is statistical significant at 1% level. On the contrary, in acquisitions of privately-held targets, we observe a different pattern: for in-house deals, average abnormal returns are -0.59% and marginally significant, whereas when an advisor is used, bidder CARs are 1.47% , and statistical significant at 1% level. Results for subsidiary targets are inconclusive. Therefore, we observe an adverse effect of financial advisors on bidding banks' cumulative abnormal returns for public and private offers. Our findings suggest that financial advisory is more meaningful to the acquisitions of privately-held targets, since private financial firms should be more opaque than their publicly-traded rivals. Lastly, Panel C of Table 4.7 details CARs based on the financial advisors' reputation. Similar to McLaughlin (1992), Rau 2000, Ismail (2010), and Graham et al., (2015), announcement abnormal returns to bidders advised by top-tier advisors are lower than those earned non-top-tier advised bidders.

Overall, we conjecture that the use of financial advisors could at least partly explain the listing effect in acquisitions by U.S. banks. In fact, when bidding banks employ financial advisors, they experience approximately 3.37% higher abnormal returns on average when the target is privately-held than when the target is publicly-traded. The difference is statistical significant at 1% level ($t=7.90$).



Table 4.7**Effect of financial advisors on bidder CARs**

This table illustrates the wealth effect of financial advisors on bidder announcement cumulative abnormal returns. The sample consists of all successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015, where complete information about financial advisors could be identified. Bidders are commercial banks with a three-digit primary SIC code equal to 602, or bank holding companies with a four-digit primary SIC code equal to 6712. Targets are comprised of publicly traded, privately-held firms, and unlisted subsidiaries of publicly traded firms. Abnormal returns are estimated using the market adjusted returns model for a five-day event window centered on the announcement date (-2, +2). Panel A segments bidder CARs based on whether the merger was in-house (no investment bank retained) or at least one financial advisor was involved. Panel B segments bidder CARs based on the reputation of the financial advisor employed by the bidding bank. The median CARs are in brackets and the number of mergers is below the medians. The parametric test is the standardized cross-sectional test, and the non-parametric is the Wilcoxon signed rank test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	All	Public	Private	Subsidiary
Panel A: All Bids				
	-0.49% ***	-1.75% ***	0.88% ***	0.53%
	[-0.66%] ***	[-1.73%] ***	[0.43%] ***	[-0.44%]
	1055	540	443	72
Panel B: Financial Advisor				
In-house	-0.55% **	-0.56%	-0.59% *	0.60%
	[-0.48%] **	[-1.26%]	[-0.40%]	[0.49%] ***
	194	61	127	6
Bidder used	-0.48% ***	-1.90% ***	1.47% ***	0.52%
advisor	[-0.72%] ***	[-1.81%] ***	[0.66%] ***	[-0.44%]
	861	479	316	66
Panel C: Reputation of Financial Advisor				
Top-Tier	-1.57% ***	-2.18% ***	0.07%	-0.40%
	[-1.67%] ***	[-2.23%] ***	[0.31%]	[-0.44%]
	261	184	47	30
Non Top-Tier	0.00%	-1.73% ***	1.72% ***	1.30%
	[-0.28%]	[-1.45%] ***	[0.73%] ***	[-0.46%]
	600	295	269	36

4.5. Multivariate analysis

In the previous section, we analyze the bidding banks' abnormal returns using univariate analysis. The results of the univariate analysis indicate considerable variation in bidder abnormal returns. Therefore, we perform multivariate tests of the determinants of bidder CARs, to ensure the robustness of the aforementioned results. In our regression, we estimate bidder returns as a function of deal- and bidder-specific characteristics, frequently used in the literature. The dependent variable is

the five-day bidder CARs centered on the announcement date. All independent variables are defined in the Appendix (Table 4.1).

Hence, we conduct OLS regressions for the whole sample of 2,178 mergers and for three separate subsamples based on the target firm's listing status. For each category we run several models, to account for the differences in usable observations between the initial sample and the sample where financial advisor data are used. Further, in order to reduce a possible effect of outliers, we winsorize all the continuous variables at 1% and 99% level. We control for heteroskedasticity by estimating robust standard errors, following White (1980). Correlation coefficients of the independent variables indicate a weak to moderate degree of linear relationship among the several sets of variables.⁴⁶ Hence, to investigate whether multicollinearity is present in our models, we calculate the variance inflation factors (VIFs) for each independent variable in each regression. In general, VIF values greater than 10 may merit further investigation. In our case, mean VIFs range from 1.89 to 3.94, suggesting that multicollinearity should not be a problem in our regression analysis.

4.5.1. Regression analysis results

Table 4.8 presents the results of our multivariate regressions for all, public, private, and subsidiary acquisitions, respectively. The first three columns illustrate results for the whole sample, irrespective of the target firm's listing status. In all three models, the coefficients of Private and Subsidiary are positive and statistical significant. The magnitude of their coefficients suggests that: (1) the average acquisition of a privately-held firm earns a 1.5% in model 1 and a 2% in models 2 and 3 larger abnormal return than the average acquisition of a public firm, and (2) the average

⁴⁶ The highest correlation coefficient is 0.56 (in absolute value) between Bidder Size and RelSize, for the subsample of 1,291 private targets.



acquisition of a subsidiary earns a 1.2% in models 1 and 2 and a 1.3% in model 3 larger abnormal return than the average acquisition of a public firm. These results are in line with prior studies that document a listing effect in non-financial U.S M&As (Fuller et al. 2002; John et al 2010). Consistent with Officer et al. (2009), Bidder idiosyncratic volatility has a significant positive effect on bidder CARs in models 1 and 3. In unreported results we also included an interaction term of Volatility with Stock, with no substantive changes in our results.⁴⁷ A handful of the remaining independent variables bear statistical significant coefficients in the regressions for the whole sample. The coefficient of Combo is negative and significant in models 1 and 3, suggesting that combination offers translate to lower bidder abnormal returns. RelSize is negative and significant in model 1, but loses significance as financial advisor data are included in the analysis. The negative coefficient of Pooling indicates that when bidding banks use the purchase method to incorporate the target into their books, they experience larger abnormal returns. Coefficients for the regulatory dummies are all positive, but significant for the FIRREA, GLBA, and DFA period in model 1, and only GLBA and DFA periods in model 3, respectively. These findings indicate that bidder abnormal returns were significantly larger for bids occurring during these specific regulatory periods, compared to the Pre-FIRREA period.

Models 4 to 6 report regression results for the subset of publicly-traded targets. Consistent with the results for the whole sample, combination offers relate to a negative market reaction in acquisitions of public targets. In addition, RelSize is negative and significant in model 4, suggesting that bidder's returns decrease with the relative size of the target in public acquisitions (Jensen and Ruback, 1983;

⁴⁷ Moeller et al. (2007) find a negative relationship between bidder CARs in public bids financed with stock and bidder idiosyncratic volatility.



Travlos, 1987). Volatility is positive and significant in model 4, albeit loses significance with the addition of the financial advisor data. On the other hand, Pooling has a negative and statistical significant coefficient in all models, implying that the purchase method is superior to the pooling accounting method in terms of bidder CARs, for public bids. Furthermore, the variable Advisors is negative, and statistical significant in both models 5 and 6. The magnitude of its coefficients indicate that in public offers, bidders who use financial advisors experience -1.2% in model 5, and -1.7% in model 6, lower abnormal returns than bidders of in-house deals, on average. Lastly, coefficients for FIRREA, GLBA, and DFA, suggest that these regulatory periods had a significantly positive effect on bidder CARs, compared to the Pre-FIRREA period (Gupta and Misra, 2007, Leledakis and Pyrgiotakis, 2016).

Results for the private offers are similar to what we have found with the univariate analysis. The insignificant coefficients of Stock and Combo in all three models suggest that method of payment does not influence bidder returns in acquisitions of privately-held targets. This finding contrasts the traditional explanation of the listing effect in non-financial U.S. mergers, which suggest that when bidders pay with stock in private offers they experience larger abnormal returns (Chang, 1998). Consistent with Fuller et al. (2002), we document a different relationship between bidder returns and the relative size of the target for public and private bids. In particular, RelSize is positive and significant in both models 7 and 9, implying that the larger the target relative to the bidder in private offers, the larger the abnormal returns upon the announcement of the merger. As expected, the coefficient of Advisors in model 8 is positive and significant at 1% level. This suggests that in private offers, bidders who employ financial advisors earn a mean abnormal return of 1.6% larger than bidders

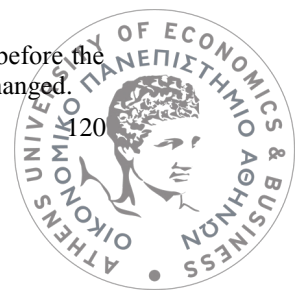


of in-house deals. We therefore observe an adverse effect of financial advisors between public and private bids. Financial advisory services, such information gathering and processing should be more valuable in private acquisitions, since privately-held financial firms would be inherently more difficult to value than their publicly-traded counterparts. In model 7, the coefficients for the regulatory dummies are similar to the ones reported for the public bids. However, when advisor data are added, all regulatory dummies lose significance, while the coefficient for the Advisors dummy remains significant. Finally, regressions 10 to 12 produce inconclusive results, suggesting that the traditional determinants of bidder abnormal returns do not explain the variation in bidding bank CARs for acquisitions of subsidiary targets.

Interestingly, our results suggest that the size of the acquirer does not have a significant impact on the market reaction at the announcement of the merger.⁴⁸ This findings contrast Moeller et al. (2004), who document that larger acquirers experience smaller abnormal returns. Houston and Ryngaert (1994), and DeLong (2001), support that geographical focus is associated with higher abnormal returns in bank mergers. In our regression however, we find weak evidence of any relation between geographical focus and bidder CARs. Similar to Becher and Campell (2005), we do not find any empirical support that prior bidder performance (ROA), affects merger gains. Lastly, our evidence shows an insignificant relation between bidder advisor reputation and announcement returns (Servaes and Zenner, 1996).

Overall, the explanatory power of all our models is relatively low, since the Adjusted R^2 ranges from 0% to 9.8%. Nonetheless, this finding is typically observed in regressions of bidder CARs (Fuller et al. 2002; DeLong 2003; Moeller et al., 2004).

⁴⁸ We also used the natural logarithm of the bidding firm's market value of equity 5 days before the merger announcement, as an alternative specification for Bidder Size. Results remained unchanged.



4.5.2. Bidder fixed effects

It is possible that the difference in market reaction between listed and unlisted bids does not relate to the target firm's listing status. It is also possible that there could be a firm-specific driver of acquisition success that can explain the variation in bidder abnormal returns. In other words, firms that were good past acquirers are likely to engage in value-enhancing acquisitions in the future, and vice versa. In this case, the persistency of the acquirer returns may account for the positive market reaction in specific merger announcements. It is also likely, that the listing effect is due to the differences in the characteristics between bidders of public and private targets, and does not relate to the type of the target.

To control for these possibilities, Fuller et al. (2002) utilize a sample where the same bidders make different types of acquisitions. In particular, their sample consists of firms that made at least five successful acquisitions within a three-year period (both public and nonpublic). This research design enables the direct examination of the differences in announcement period returns for bidders of both public and private targets. Their results confirm the existence of a listing effect for firms that acquire targets of different listing status, in non-financial U.S. mergers. In our study however, we focus primarily on financial firms. This means that if we apply the criteria of Fuller et al. (2002), the number of usable observations will be dramatically decreased. Hence, in the spirit of Golubov et al. (2015), we include bidder fixed effects in the baseline regressions of Table 4.8, to test whether our results are determined by the listing status of the target firm, or the bidding firm itself.⁴⁹ With this approach, we examine whether there is an unobserved, time-invariant, bidder-

⁴⁹ In this case, we do not partition the sample based on the target firm's listing status, since the same bidder could have acquired both private and public targets.



Table 4.8**OLS regression on bidder CARs**

This table reports the OLS regression results of the bidder's five day CARs for a sample successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. All independent variables are defined in the Appendix (Table 4.1). All continuous variables are winsorized at 1% and 99% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	All			Public			Private			Subsidiary		
	1	2	3	4	5	6	7	8	9	10	11	12
Constant	-0.017 (-1.53)	-0.013 (-0.83)	-0.030* (-1.65)	-0.018 (-0.91)	0.011 (0.44)	-0.010 (-0.37)	-0.008 (-0.62)	-0.018 (-0.78)	-0.028 (-1.12)	-0.035 (-1.02)	-0.052 (-0.76)	-0.046 (-0.54)
State	0.001 (0.67)	0.005 (1.60)	0.006* (1.81)	0.001 (0.26)	0.004 (0.90)	0.004 (0.91)	0.001 (0.41)	0.006 (1.35)	0.007* (1.66)	0.011 (1.21)	0.016 (1.01)	0.011 (0.67)
Stock	0.001 (0.58)	0.001 (0.16)	0.000 (0.10)	-0.003 (-0.77)	-0.003 (-0.42)	-0.003 (-0.47)	0.001 (0.49)	-0.001 (-0.12)	-0.001 (-0.09)	0.003 (0.26)	-0.014 (-0.50)	-0.027 (-0.91)
Combo	-0.005** (-1.97)	-0.004 (-1.01)	-0.007* (-1.85)	-0.012** (-2.49)	-0.011 (-1.64)	-0.014** (-1.96)	-0.003 (-1.08)	0.001 (0.20)	-0.003 (-0.56)	0.000 (0.01)	-0.006 (-0.21)	-0.008 (-0.31)
RelSize	-0.014** (-1.99)	-0.014 (-1.59)	-0.012 (-1.39)	-0.018** (-2.10)	-0.012 (-1.23)	-0.009 (-0.95)	0.023* (1.78)	0.026 (1.45)	0.031* (1.69)	-0.006 (-0.13)	0.017 (0.21)	0.029 (0.36)
Bidder Size	-0.001* (-1.81)	-0.001 (-0.45)	-0.000 (-0.33)	-0.001 (-0.60)	-0.000 (-0.22)	-0.000 (-0.02)	-0.001 (-0.77)	0.000 (0.14)	0.001 (0.45)	0.005 (0.19)	0.004 (0.77)	0.001 (0.29)
Private	0.015*** (6.72)	0.020*** (6.09)	0.020*** (6.18)									
Subsidiary	0.012*** (2.96)	0.012* (1.73)	0.013* (1.79)									
Volatility	0.698*** (3.67)	0.402 (1.43)	0.561** (1.98)	0.571* (1.70)	0.223 (0.50)	0.307 (0.68)	0.616** (2.55)	0.330 (0.85)	0.581 (1.48)	1.434 (1.53)	1.580 (1.08)	1.890 (1.42)
ROA	0.002 (0.82)	-0.002 (-0.57)	-0.000 (-0.02)	0.002 (0.60)	-0.004 (-0.82)	-0.003 (-0.50)	0.001 (0.34)	0.000 (0.06)	0.005 (0.69)	0.007 (0.92)	-0.003 (-0.18)	-0.003 (-0.20)
Pooling	-0.009*** (-3.31)	-0.012*** (-2.84)	-0.006 (-1.50)	-0.015*** (-3.46)	-0.019*** (-3.39)	-0.016*** (-2.68)	-0.004 (-1.10)	0.001 (0.22)	0.007 (1.13)	-0.056* (-1.82)	-0.105* (-1.71)	-0.119* (-1.88)

Table 4.8 (Continued)

	All			Public			Private			Subsidiary		
	1	2	3	4	5	6	7	8	9	10	11	12
Advisors		0.007*	0.001		-0.012**	-0.017***		0.016***	0.011*		-0.011	-0.031
		(1.80)	(0.26)		(-2.13)	(-2.73)		(3.27)	(1.88)		(-0.44)	(-1.06)
Top-Tier		-0.005	-0.001		-0.001	0.002		-0.009	-0.004		-0.002	-0.001
		(-1.16)	(-0.15)		(-0.27)	(0.39)		(-1.43)	(-0.56)		(-0.14)	(-0.07)
FIRREA	0.009***		0.011	0.016**		0.021**	0.008**		-0.004	-0.004		0.016
	(3.10)		(1.49)	(2.34)		(2.09)	(2.33)		(-0.38)	(-0.30)		(0.34)
Riegle-Neal	0.001		0.001	0.004		0.011	0.001		-0.016	-0.008		0.026
	(0.17)		(0.17)	(0.47)		(0.95)	(0.12)		(-1.53)	(-0.60)		(0.55)
GLBA	0.010***		0.017**	0.015**		0.024**	0.00738**		0.001	0.006		0.043
	(3.30)		(2.24)	(2.27)		(2.38)	(2.05)		(0.07)	(0.43)		(0.93)
DFA	0.021***		0.026***	0.025***		0.031***	0.021***		0.013	0.009		0.064
	(5.65)		(3.16)	(3.05)		(2.66)	(5.02)		(1.28)	(0.42)		(1.33)
N	2,178	1,055	1,055	790	540	540	1,219	443	443	169	72	72
Adjusted R ²	0.084	0.081	0.097	0.059	0.035	0.050	0.041	0.048	0.070	0.012	0.00	0.00

specific factor that can better explain the difference in market reaction between listed and unlisted bids. In our fixed effects regressions we include dummy variables to account for the different types of the target (Private, Subsidiary) as well as interactions terms between Private and Subsidiary dummies, with the Advisors and Top-Tier dummies, respectively. To ensure the robustness of our aforementioned results, we expected the coefficients for the privately-held targets to be positive and statistical significant. As before, the dependent variable in all our regression is the five-day bidder CAR, centered on the announcement date.

Table 4.9 illustrates the results of our fixed effects regressions. The coefficients of Combo, RelSize, Volatility, Pooling, FIRREA, GLBA, and DFA are similar to what we have found in the OLS regressions. Strikingly, our results indicate, that there is indeed a firm-specific factor that drives bidder abnormal returns. In all our models, bidder fixed effects are highly significant (at 1% level), leading us to reject the null hypothesis of insignificant joint effects. These findings imply that bidder returns are persistent overtime: good acquirers continue to create shareholder wealth value through M&As, while bad acquirers continue to perform poorly. Furthermore, in line with Golubov et al. (2015), the inclusion of the bidder fixed effects almost doubles the explanatory power of our regression models, since the Adjusted R^2 ranges from 17.2% to 17.4%. However, what it is important to us is that the coefficients of Private and Private*Advisors are also positive and significant. The magnitude of its coefficient is comparable to what reported in Table 4.8.

These findings suggest that when bidding banks buy privately-held targets, and particularly when they employ a financial advisor for the transaction, they experience larger abnormal returns relative to their peers, even after controlling for any time-invariant bidder characteristics.



Table 4.9**Fixed effects regression on bidder CARs**

This table reports the fixed effects regression results of the bidder's five day CARs for a sample successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. All independent variables are defined in the Appendix (Table 4.1). All continuous variables are winsorized at 1% and 99% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The joint significance of bidder fixed effects (FE) is also reported. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	(1)	(2)	(3)
Constant	-0.009 (-0.33)	-0.004 (-0.12)	0.017 (0.46)
State	0.002 (0.68)	0.006 (1.47)	0.006 (1.44)
Stock	-0.001 (-0.53)	-0.007 (-1.22)	-0.007 (-1.28)
Combo	-0.008*** (-2.91)	-0.015*** (-2.76)	-0.017*** (-3.00)
RelSize	-0.026*** (-2.78)	-0.029*** (-2.83)	-0.031*** (-3.00)
Bidder Size	0.000 (-0.17)	0.002 (0.59)	-0.004 (-0.99)
Private	0.009*** (3.61)		
Subsidiary	0.005 (1.02)		
Private*Advisors		0.012** (2.28)	0.011** (2.01)
Private*Top-Tier		-0.003 (-0.44)	-0.002 (-0.21)
Subsidiary*Advisors		-0.005 (-0.44)	-0.005 (-0.43)
Subsidiary*Top-Tier		-0.006 (-0.35)	-0.006 (-0.37)
Volatility	0.508** (1.98)	0.174 (0.36)	0.349 (0.70)
ROA	-0.001 (-0.28)	-0.008 (-1.24)	-0.004 (-0.50)
Pooling	-0.010*** (-3.39)	-0.009** (-1.97)	-0.007 (-1.45)
FIRREA	0.007* (1.86)		0.019** (2.03)
Riegle-Neal	-0.001 (-0.12)		0.012 (1.22)
GLBA	0.006 (0.88)		0.025** (2.27)
DFA	0.019** (2.34)		0.035*** (2.70)
Number of unique bidders	506	392	392
Bidder FE <i>F</i> -test	1.452***	1.258***	1.239***
N	2,178	1,055	1,055
Adjusted <i>R</i> ²	0.172	0.168	0.174

4.5.3. Control for sample selection

Our analysis so far is based on the assumption that the choice of target firm is exogenously determined. However, it is likely that the acquirers of private targets in our sample were not selected randomly from the population of U.S. banking firms, suggesting that the type of the target firm may be determined endogenously. In this case, the choice of a target firm may be correlated with certain bidder and/or deal-specific characteristics, and the OLS estimates become unreliable. To address this sample selection issue, we employ Heckman's (1979) two-stage procedure, using the inverse Mills ratio.

As in Doukas et al. (2014), the first-stage equation of the Heckman's procedure is estimated by a probit regression, where the dependent variable is one for acquirers of private targets and zero for acquirers of public targets. From this stage we construct the inverse Mills ratio that we add as an additional independent variable in the second-stage equation. Next, the second-stage equation is an OLS regression where the dependent variable is bidder CARs for private deals only. The coefficients we obtain from this regression are corrected for the sample selection bias.

Table 4.10 presents the results for this analysis. We conduct the Heckman's procedure three times, to obtain comparable results with the ones reported in Table 4.8. According to our probit models, the choice of private target is negatively related to geographical focus, any form of stock financing, relative size of the deal, bidder size, and the use of an advisor on the part of the bidder. The Pseudo R^2 of these first-stage equations indicate that our probit models explain up to 29.7% of the choice between a public and a private target. More importantly, the results from the OLS regression in the second-stage equations are almost identical with the results in Table 4.10. In private offers, bidder CARs increase with the use of a financial advisor, after

Table 4.10**Heckman two-stage procedure on bidder CARs**

This table reports the results of the Heckman two-stage procedure for bidder five day CARs for a sample successful M&As by U.S. banking firms, with initial bids announced between January 1, 1984 and December 31, 2015. The first column of each set of models is the first-stage equations estimated by probit regressions, in which the dependent variable is 1 if the target firm was private and 0 if it was public. The second column of each set of models is the second-stage equations estimated by OLS regressions, where the dependent variable is the bidder CARs for private bids, and the Inverse Mills ratio accounts for the presence of selection bias. All independent variables are defined in the Appendix (Table 4.1). All continuous variables are winsorized at 1% and 99% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	Probit	OLS	Probit	OLS	Probit	OLS
	(1)		(2)		(3)	
Constant	6.523*** (15.84)	-0.003 (-0.08)	5.853*** (10.23)	-0.025 (-0.45)	6.077*** (9.36)	-0.031 (-0.52)
State	-0.151** (-2.08)	0.001 (0.37)	-0.352*** (-3.33)	0.007 (1.32)	-0.352*** (-3.32)	0.008 (1.52)
Stock	-0.490*** (-4.78)	0.001 (0.37)	-0.607*** (-3.81)	0.002 (0.24)	-0.591*** (-3.70)	0.002 (0.21)
Combo	-0.387*** (-3.53)	-0.003 (-0.92)	-0.475*** (-3.05)	0.002 (0.37)	-0.396** (-2.45)	-0.002 (-0.32)
RelSize	-4.067*** (-12.23)	0.015 (0.53)	-3.143*** (-10.03)	0.024 (0.57)	-3.203*** (-9.87)	0.025 (0.59)
Bidder Size	-0.503*** (-15.81)	-0.001 (-0.42)	-0.499*** (-10.39)	0.001 (0.20)	-0.503*** (-10.34)	0.001 (0.23)
Volatility	3.404 (0.54)	0.589** (2.42)	8.672 (1.10)	0.245 (0.63)	7.931 (0.96)	0.510 (1.29)
ROA	-0.080 (-0.78)	0.001 (0.30)	-0.091 (-0.71)	0.001 (0.11)	-0.078 (-0.59)	0.004 (0.64)
Pooling	-0.160* (-1.67)	-0.004 (-1.07)	-0.062 (-0.49)	0.001 (0.18)	-0.128 (-0.90)	0.007 (1.120)
FIRREA	-0.585*** (-4.53)	0.008 (1.57)			-0.146 (-0.530)	-0.004 (-0.40)
Riegle-Neal	-0.566*** (-3.70)	0.000 (0.01)			-0.213 (-0.72)	-0.016 (-1.46)
GLBA	-0.856*** (-6.26)	0.007 (1.12)			-0.401 (-1.41)	0.001 (0.08)
DFA	-0.854*** (-5.47)	0.021*** (3.13)			-0.403 (-1.38)	0.0132 (1.07)
Advisors			-0.445*** (-3.14)	0.019*** (2.77)	-0.328** (-2.17)	0.0127** (2.07)
Top-Tier			0.034 (0.25)	-0.008 (-1.22)	-0.065 (-0.46)	-0.003 (-0.40)
Inverse Mills Ratio		0.001 (0.04)		-0.007 (-0.31)		-0.005 (-0.25)
N	2,009	1,219	983	443	983	443
Pseudo-R ² (Adjusted R ²)	0.279	(0.037)	0.294	(0.041)	0.297	(0.061)

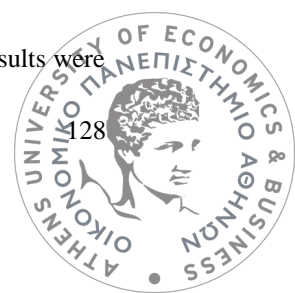
controlling for sample selection. In fact, the Inverse Mills ratio is insignificant in all three cases, suggesting that the selection bias should not be a primary concern in our regression analysis.⁵⁰

4.6. Conclusion

In this paper, we examine bidder abnormal returns in 2,178 successful M&As of publicly traded U.S. banking companies announced between 1984 and 2015, as well as the differences in stock market reaction for separate types of targets. Initially, our findings indicate the presence of a listing effect in acquisitions by U.S. banks: Cumulative abnormal returns for unlisted bids (privately-held companies and subsidiaries), are significantly larger than for listed bids. In fact, these results are in line with prior literature in non-financial U.S M&As.

The intriguing part of this analysis however, is to find an explanation for this phenomenon. Much of the existing literature in the non-financial mergers attributes the different market reaction between listed and unlisted bids to method of payment effects. In particular, these explanations predict larger bidder CARs in private offers, when the deal is financed with common stock. Equity offers could help resolving financial asymmetries in the target firm's valuation, or result in the creation of effective performance monitors in the bidding firm. Nonetheless, in our sample, we don't find any empirical support for method of payment effects in private offers. On the contrary, bidding banks gain in such transactions, even when they pay with cash, stock, or a combination of the two. Moreover, we find that our results are not due to potential leakages of information about public acquisitions or limited competition for private targets. We further account for the several legislative changes in the U.S.

⁵⁰ We repeated the same procedure for the choice between listed and unlisted targets. The results were qualitatively similar.



banking industry. Notably, the listing effect is pervasive across all regulatory reforms.

We examine the role of the financial advisors in the acquisitions by U.S. banks, and if the use of a financial advisor from the bidding banks has any predictive power in explaining announcement abnormal returns. Presumably, financial advisory services should be of major importance in reducing valuation uncertainties for acquirers of privately-held financial firms. Similarly, we predict positive abnormal returns for bidding banks that use financial advisors in private offers. Our results document that in-house acquisitions of private firms yield negative bidder returns in the scale of -0.59%, whereas when an advisor is used, bidder abnormal returns are 1.47%, and statistical significant at 1%. This substantial difference in market reaction suggests that the acquisition of privately-held financial firm results in a positive market reaction only when a financial advisor is used on the part of the bidding bank. Otherwise, the bidder abnormal returns for private bids are similar to the ones reported for public bids. Lastly, results for subsidiary targets are inconclusive, and financial advisor reputation has a negative effect in bidder CARs in all cases.

In cross-sectional regressions, where the five-day abnormal returns are the dependent variable, the listing effect is robust to the inclusion of several frequently-used independent variables such as bidder size, method of payment, geographical scope, and prior bidder performance. More precisely, our indicator variables that proxy for the listing status of the target firm and the use of bidder financial advisors in private offers are positive and statistical significant in all regressions. To account for the possibility that a bidder-specific factor may better explain the variation in bidder CARs, we included bidder fixed effects in our regressions. Despite the presence of a strong bidder fixed effect in our sample, banks that acquire privately-held financial

firms and use non-top-tier financial advisors in their transactions, experience larger abnormal returns relative to their competitors. Lastly, we control for the endogenous nature of bidder-target matching. This analysis suggests that sample selection does not influence the consistency of our OLS estimates.

Chapter 5

Do crises generate value-creating opportunities in M&As? Evidence from the European banking industry

5.1. Introduction

In the recent decades, the financial liberalization of the capital markets, deregulation, and the introduction of the common currency have significantly impacted the consolidation trends in the European banking industry (DeYoung et al., 2009). A direct effect of consolidation is the decrease in the number of banks. In fact, the number of banking institutions in the EU-15 has declined from approximately 12,000 in 1990 to just over 5,000 in the end of 2017.⁵¹ Consequently, the intense merging activity between European banks has motivated several authors to examine the causes and the implications of this phenomenon (Cybo-Ottone and Murgia, 2000; Campa and Hernando, 2004; Hagendorff et al., 2008; Asimakopoulos and Athanasoglou 2013).

Despite the general agreement behind the forces driving the consolidation trend in the EU banking industry, there is little conclusive evidence on the financial performance of these transactions. As a matter of fact, the literature that examines the stock market reaction for European bank M&As provides mixed findings. Early studies fail to identify significant wealth gains for the bidding firms (Tourani-Rad and Van Beek, 1999; Beitel and Schiereck, 2001; Ismail and Davidson, 2005), while other authors document significant abnormal returns only for domestic or product-diversifying deals (Lepetit et al., 2004; Campa and Hernando, 2006). Ekkayokkaya et al. (2009), suggest that bidder gains have fallen in the post-Euro period, due to increased competition in the M&As market. Hence, we observe the market reaction for the bidding banks depends heavily on the examination period. In addition, we

⁵¹Source:

https://www.ecb.europa.eu/stats/financial_corporations/list_of_financial_institutions/html/index.en.html



note the extant literature focuses almost exclusively in deals announced between the late-1980s and the mid-2000s.

After 2008, the global financial markets were in the midst of one of the biggest credit crisis in recent history (Campello et al., 2011). This shock had a severe impact on the financial stability of the euro area. In late 2009, a number of EU countries reported larger-than-expected increases in deficit to GDP ratios, signaling the beginning of the European sovereign debt crisis (Lane, 2012). In the outbreak of this crisis, many European banks suffered substantial deposit outflows and recorded significant losses from the rapid increase in non-performing loans and their exposures to sovereign debt (Betz et al., 2014; Chan-Lau et al., 2015). While unfortunate, a crisis environment could create opportunities for financially healthy corporations to exert their dominant position in the market by acquiring less solvent firms (Acharya et al., 2011). We argue that in this period of financial market distress, few banks might meet the sufficient criteria to become bidders. On the contrary, increased capital and liquidity standards along with the low-profitability environment will urge many problematic institutions to become targets. Under this scenario, bidding banks may be benefited in two ways: (1) the announcement of an acquisition may be interpreted as a sign of financial health on the part of the bidder, and (2) lower competitive pressures in the M&As market could allow bidding banks to exploit their position by achieving favorable acquisition terms. Following these remarks, the European sovereign debt crisis may constitute an ideal setting for studying the investors' perception regarding bank M&As during a crisis period.

Therefore, the aim of this paper is to investigate whether the stock market reaction for European bank M&As has indeed changed as a result of the crisis, and if so, why.

We are particularly interested in investigating whether the constrained financial



environment in the EU could create opportunities for healthy institutions to engage in value-creating acquisitions. To do so, we analyze a sample of 522 completed European bank M&As announced between 1990 and 2016. Using the event study methodology, we estimate bidder abnormal returns around the announcement of these transactions, and we examine potential differences between two sub-periods, before the crisis (1990 to 2008) and during the crisis (2009 to 2016).

Our results provide novel evidence that the financial crisis has indeed created opportunities of financial gains for the bidding banks. More precisely, since 2009, bidders bank realize a mean return of 1.96% over a three-day window centered on the announcement date, figure that is statistically significant at all levels. Notably, bidder gains of such magnitude have not been previously reported in other relevant studies. In economic terms, this market reaction translates to a shareholder value increase of \$34.20 million for the average bidder, suggesting that these merger gains are not skewed towards smaller institutions (Moeller et al., 2004). For the pre-crisis period, bidder abnormal returns upon the announcement are essentially zero, but acquiring firms lose \$21.72 million on average upon announcement. Interestingly, the difference between the two periods is approximately 2.32%, and statistical significant at 1%. Motivated by these results, we conduct several cross-section regressions to investigate the reasons behind this significant positive effect of the crisis years on bidder announcement gains. In short, the regression estimates reinforce the findings of the univariate analysis and provide some additional valuable insights. We find that the observed pattern in bidder returns during the crisis is strongly related to the financial strength of the bidding bank: banks with higher efficiency and lower non-performing loans ratio achieve higher abnormal returns when they announce an acquisition during the crisis period.



Our paper makes several contributions to the existing bank M&As literature. First, it adds to our understanding of the effects of the European sovereign debt crisis on the bank merger activity. We bring new evidence that the stock market reaction at the announcement of these deals has significantly changed in favor of the bidding banks. Throughout this crisis, financially healthy banks constantly engage in value-creating acquisitions. This finding contrasts the consensus view, that bidding banks lose at the acquisition announcement date. In this respect, our findings deviate from the previous research and can be of interest not only to academics but also to bank managers, investors, and regulators. Second, we compare our findings for the crisis period with the two decades of 1990s and 2000s, in an effort to extract robust inferences regarding merger gains overtime. To do so, we utilize a large sample of European bank M&As that includes all the separate examination periods analyzed in relevant studies. As such, we draw conclusions that do not depend on specific phases of the monetary union. From 1990 to 2008, European bank M&As destroyed more value than they created for acquiring firms shareholders. Since 2009 however, this trend is reversed, since bank mergers create more value than ever before.

To the best of our knowledge, the only study that examined the impact of the crisis on bank M&As in Europe is Beltratti and Paladino (2013). The authors argue that in periods of financial market distress, market participants may postpone their reaction from the announcement to the completion date, due to the increased uncertainty regarding the final materialization of the proposed merger. According to this argument, they find zero abnormal returns at the announcement date and positive returns at the completion date for a sample of 139 deals announced between 2007 and 2010. To consider this possibility, we also examined bidder abnormal returns at the deal completion date. Indeed, we find positive and significant gains during the

crisis period and insignificant returns for the pre-crisis period. However, by comparing the probabilities of acquisition success before and during the crisis, we find the bidding banks are approximately 6% more likely to complete an acquisition during the crisis than before. Hence, this difference in market reaction between the two periods should not be attributed to the increased uncertainty of the crisis period.

In this study, we follow a different line of thinking to analyze the variation in completion CARs. One of the most stylized facts in the corporate finance literature is that in an efficient market, investors should be able to anticipate value-creating deals at the announcement date (Agrawal et al., 1992). If this argument is valid, we expect that any reaction at the completion date should have the same sign with the announcement date. Following this argument, we also assume that the proportion of positive completion CARs should be higher in the crisis period, where the proportion of announcement CARs is also higher. Thus, to elaborate in this hypothesis, we examine the relation between announcement and completion CARs. Our findings indicate a consistent positive relation between announcement and completion abnormal returns irrespective of the time period, using both univariate and multivariate tests. In our regressions also, after controlling for the announcement period gains, the crisis indicator loses any explanatory power. Therefore, we argue that the positive reaction at the deal completion date since 2009 is not a direct effect of the crisis itself, but it constitutes an additional positive price revision to those bids that were already anticipated as value-creating at the announcement.

The rest of the paper is organized as follows. Section 2 reviews the relevant empirical literature and discusses the testable hypotheses. Section 3 describes the sample selection process and methodology. Sections 4, 5, and 6 discuss our results, and Section 7 concludes the paper.

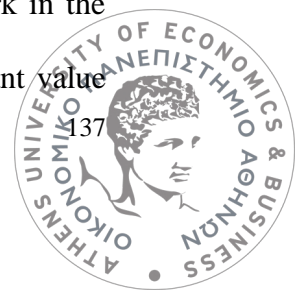


5.2. Theoretical background and motivation

5.2.1. An overview of the bank M&A literature

There is a plethora of studies examining the stock market reaction to bank M&As announcements. This strand of the literature utilizes the event study methodology to examine potential merger-related gains. The vast majority of the early literature focuses on the U.S. banking industry. The consensus view regarding U.S. bank M&As is that on average, 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; Cornett and Tehranian, 1992; Houston and Ryngaert, 1994; Houston et al., 2001; DeLong and DeYoung, 2007). However, studies that examine the merging activity under a regulatory scope, indicate that in under certain circumstances, U.S. bank M&As can result in stockholder value enhancement (Becher, 2009; Filson and Olfati, 2014; Leledakis and Pyrgiotakis, 2016).

Evidence on European bank M&As reports controversial results. Tourani-Rad and Van Beek (1999) show that bidders make no significant gains over the period 1989 to 1996, while targets experience abnormal returns in the order of 5%, figure that is substantially smaller from what reported in relevant U.S. studies. On the other hand, Cybo-Ottone and Murgia (2000) diverge from such findings by documenting significantly higher bidder, target, and combined CARs. By using the Datastream general market index as benchmark, the authors demonstrate positive bidder abnormal returns in several event windows, while combined CARs were positive and highly significant in all days surrounding the event. However, all bidder gains disappear when the Datastream bank sector index is used as the benchmark in the asset-pricing model. Similarly, Beitel and Schiereck (2001) report significant value



creation for a sample of 98 European bank M&As, mainly driven by large target shareholder returns. Ismail and Davidson (2005), find also positive combined CARs, although they are very modest in amplitude.

In order to explain this aforementioned pattern in abnormal returns for European deals, several authors have utilized bivariate analysis and examined the relation between abnormal returns and geographical and/or product diversification. Beitel et al. (2004), suggest that bidders of domestic targets realize positive merger gains, whereas bidders of foreign targets experience negative abnormal returns in the scale of -0.85% . Lepetit et al. (2004) confirm these findings and also argue that cross-product diversification could be a source of value creation for European bank M&As. Furthermore, Campa and Hernando (2004, 2006), indicate that larger value creation occurs when both merging firms are headquartered in the same European country. Ekkayokkaya et al. (2009) document that product-diversifying deals fare significantly better than in-market deals (mergers between commercial banks), in terms of abnormal returns. Further, their findings indicate that bidder gains have fallen with the introduction of the common currency, due to increased competition in the EU takeover market. Lastly, Asimakopoulos and Athanasoglou (2013) find that bidding banks exploit benefits from geographical focus only when the target firm is publicly-traded, highlighting the importance of an organized exchange as a discipline mechanism in the stock markets.

The recent European bank M&As literature attempts to shed more light in the determinants of merger-related gains. Hagendorff et al. (2008), compare bidder CARs for U.S. and European bank mergers, and find value losses for the former firms, and positive wealth gains for the later firms, respectively. Consequently, the authors attribute this pattern in abnormal returns to the level of investor protection of

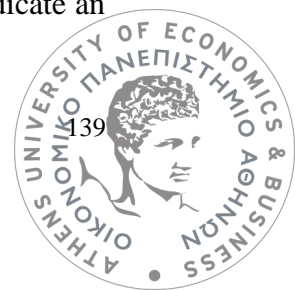


the target firms. Hankir et al. (2011), confirm the aforementioned difference in bidder CARs between U.S. and European firms, and indicate that market power is the main reason behind bank consolidation. Vallascas and Hagendorff (2011) analyze 134 completed European bank M&As over the period 1992 to 2007. They report mean bidder CARs of 0.726 for the whole sample, but fail to identify any significant relation between abnormal returns and merger-related changes in bidding banks' default risk.

Collectively, these studies indicate that European bank bidders realize minimal or economic trivial abnormal returns. Yet, under certain circumstances such as geographical focus or product diversification, bank M&As could be value creating for acquiring firms. It is worth-mentioning however, that these results are heavily-dependent on the examination period, given that the sign and magnitude of bidder CARs fluctuate over the years.

5.2.2. Merging activity during the crisis

The global financial crisis has motivated academics to question many widely held beliefs regarding the market perception for M&As. Alexandridis et al. (2017), use a large sample of 26,078 U.S. M&As announced between 1990 and 2015 to study the effects of the 2008 financial crisis in corporate decision making. The authors document a significant shift in acquirer returns after the crisis, since acquirers in public deals experience 2.13% higher abnormal returns on average after 2008. Focusing in Europe, Ayton and Rao-Nicholson (2018), examined 1263 M&As between nonfinancial firms over the period 2004 to 2012. According to their study, non-Eurozone acquirers that expand into Eurozone countries experience higher abnormal returns as a result of the financial crisis. Both studies therefore, indicate an improvement in the financial performance of acquiring firms after 2008.



In the banking industry, merger gains are rather elusive during normal economic times. However, in times of financial distress, it is likely that “strong” financial institutions may exert their dominant position in the market for the benefit of their shareholders. During crisis periods, more liquid and well-capitalized banks may have the opportunity to increase their profitability and market share (Berger and Bouwman, 2009). Also, banks with stronger balance sheets may be benefited by acquiring other banks at fire-sale prices (Acharya et al., 2011). Following these arguments, Beltratti and Paladino (2013) examine the impact of the financial crisis on European bank mergers. Their preliminary findings do not support the aforementioned arguments, since bidder CARs at the announcement date are insignificant. On the contrary, they report positive and statistical significant returns at the deal completion date over some specific event windows. Based on these results, the authors hypothesize that market participants are more reluctant to react to merger announcements in crises periods, and postpone the repricing of the bidding firms’ stocks at the deal completion date. In this spirit, Rao-Nicholson and Salaber (2015), note that banking acquisitions around the globe should perform better after the crisis than before. According to their findings however, the difference in bidder CARs between the two periods is insignificant. Hence, to date, there is no conclusive evidence that bank M&As create shareholder value as a result of the crisis.

In the wake of the global financial crisis and the European sovereign debt crisis, the European banking industry has been overpopulated and under stress. By the end of 2017, more than 5,000 banks that still operate in the Eurozone.⁵² However, many of these banks have solvency issues due to low-profitability, depleted levels of capital, and the high intensity of non-performing loans in their balance sheets (Cipollini and

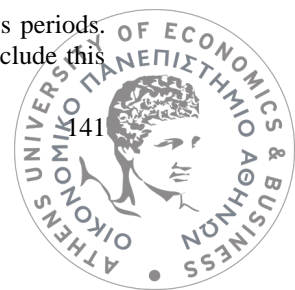
⁵² Source: <https://www.ecb.europa.eu/pub/pdf/other/reportonfinancialstructures201710.en.pdf>.



Fiordelisi, 2012; Betz et al., 2014; Black et al., 2016). In terms of equity return performance, Chan-Lau et al. (2015) find that European banks have experienced large declines in shareholder value, due to the market concerns regarding their exposures in sovereign debt. The authors find however that better capitalized and less leveraged firms were able to outperform their less solvent peers. Gibson et al. (2016), examine bank performance in PIIGS countries (Portugal, Ireland, Italy, Greece, and Spain), and find that rises in sovereign risks and spreads are negatively associated with equity prices. Considering these findings, it is likely, that in this financial distressed environment, fewer banks will have the ability to acquire other institutions, while more banks will be in the vulnerable position to become targets. In this regard, financially healthy banks may have the privilege to be more selective in their acquisition strategies, and engage in value-creating deals. If these arguments are valid, then we expect to find a change in the way market participants view bank acquisitions in Europe during the crisis period.

Overall, we conjecture that the European sovereign debt crisis offers a live laboratory for the research questions explored in this study. Motivated by this remark, we choose to investigate whether this financially distressed environment has significantly altered the behavior of market participants towards bank M&As. Standing in 2018, we have the ability to investigate in depth the effects of this long-lasting crisis in banking acquisitions. Throughout the remainder of this study, we define the crisis period as all these years from 2009 and after, since by the first quarter of this year, all European economies had entered into recession (Claessens et al., 2010).⁵³

⁵³ Our results remained robust to several different specifications of the pre-crisis and crisis periods. We change the beginning year of the crisis period to 2007, 2008, or 2010, and we also exclude this years from the analysis. All those changes had no impact on our results.



5.3. Data selection and methodology

5.3.1. Sample selection

We obtain our M&As sample from Thomson Reuters EIKON database. The selected deals consist of all M&As by European banking firms announced between January 1, 1990, and December 31, 2016. Our initial sample is retrieved based on the following criteria:

1. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies.
2. Both bidders and targets are located in the EU-15, plus Norway and Switzerland.
3. Bidding firms are classified as public, while targets may also be privately-held firms or subsidiaries.
4. The bidding firm acquired an interest of 50% and above in the target, raising its interest from less than 50% to more than 50%.
5. Bidding firms have available equity returns data on Datastream and accounting data on Worldscope.

These criteria yield a sample of 599 observations. We follow Fuller et al. (2002), and we exclude 54 clustered mergers, in order to isolate the wealth effect for a specific merger. Clustered mergers are defined as those deals where the same bidder acquired more than one target on a given day. We also eliminate 2 duplicate listings from the sample. Duplicates are instances where the same acquisition is reported more than one in the database. Further, we omit 10 deals due to the fact that equity returns data ended before the merger announcement date. Lastly, by verifying our merger data



against news articles from several sources, we delete 11 deals, due to inconsistencies between the database and press coverage.⁵⁴ Hence, our final sample consists of 522 M&As by European banks.

5.3.2. Sample characteristics

Table 5.1 depicts the aggregate annual number of deals segmented by geographical scope and product diversification, respectively. In line with prior studies, most of the merger deals in the financial industry are among domestic banks (Campa and Hernando, 2006; Asimakopoulos and Athanasoglou, 2013). This pattern is initially observed in the pre-euro period, given the largely segmented nature of the European financial market before the introduction of the common currency (Ekkayokkaya, 2009). Notably, in 1999, we observe a peak in merging activity. In this year, the number of M&As represent the 6.70% of our whole sample. In the early 2000s, the distribution between geographical and product diversifying deals is similar to what reported in the pre-1999 period, despite the fact that in some specific years, the percentages of cross-border mergers were significantly increased. Such change may reflect the increased market integration and the elimination of the national currency risks, in the post-euro era. Since 2009 however, M&As activity has substantially declined in terms of number of deals, except from 2016, where we report figures comparable to the pre-crisis period. Over the same period also, a limited number of cross-border and/or cross-product deals occurred, since European bidding banks focus almost exclusively to national targets that belong to the same industry. Considering these facts, it is likely that European banks face less competitive pressures in the market for corporate control during the crisis period than before.

⁵⁴ For example, Banca Antonveneta SpA was classified as listed in its late 1990s acquisitions, despite the fact that the bank became publicly-traded in 2002.



Table 5.1**Distribution of M&As by year, geographical and product focus**

The table reports the annual number of deals for a sample of 522 completed European M&As announced between 1990 and 2016. Both bidders and targets are located in EU-15, plus Norway and Switzerland. The sample consists of mergers between public bidders and public, private, or subsidiary targets. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies. Geographic-focused are those mergers where both firms are located in the same country. Product-focused are the mergers between two commercial banks. We report in parentheses the percentages of each subsample to the annual number of deals.

Year	Number of Mergers	% of the sample	Number of geographic-focused mergers	Number of product-focused mergers
1990	12	2.30%	5 (41.67%)	9 (75.00%)
1991	17	3.26%	15 (88.24%)	10 (58.82%)
1992	12	2.30%	9 (75.00%)	9 (75.00%)
1993	17	3.26%	14 (82.35%)	13 (76.47%)
1994	24	4.60%	21 (87.50%)	24 (100.00%)
1995	25	4.79%	20 (80.00%)	17 (68.00%)
1996	14	2.68%	13 (92.86%)	12 (85.71%)
1997	31	5.94%	22 (70.97%)	20 (64.52%)
1998	23	4.41%	17 (73.91%)	16 (69.57%)
1999	35	6.70%	22 (62.86%)	27 (77.14%)
2000	18	3.45%	11 (61.11%)	11 (61.11%)
2001	25	4.79%	18 (72.00%)	19 (76.00%)
2002	20	3.83%	18 (90.00%)	16 (80.00%)
2003	16	3.07%	10 (62.50%)	12 (75.00%)
2004	22	4.21%	14 (63.64%)	15 (68.18%)
2005	17	3.26%	9 (52.94%)	11 (64.71%)
2006	22	4.21%	11 (50.00%)	16 (72.73%)
2007	21	4.02%	16 (76.19%)	15 (71.43%)
2008	25	4.79%	18 (72.00%)	24 (96.00%)
2009	15	2.87%	13 (86.67%)	15 (100.00%)
2010	14	2.68%	12 (85.71%)	13 (92.86%)
2011	15	2.87%	11 (73.33%)	12 (80.00%)
2012	17	3.26%	17 (100.00%)	15 (88.24%)
2013	18	3.45%	17 (94.44%)	15 (83.33%)
2014	15	2.87%	13 (86.67%)	14 (93.33%)
2015	10	1.92%	7 (70.00%)	10 (100.00%)
2016	22	4.21%	18 (81.82%)	20 (90.91%)
Total	522	100.00%	391 (74.90%)	410 (78.54%)

Table 5.2 shows the geographic dispersion of the merging firms by bidder and target firms' country. Bidders from Italy, Germany, United Kingdom, Switzerland, and Spain were the most active during the whole examination period. Interestingly, the vast majority of target firms originate from the same countries. In addition, banks from Germany and France expanded in several other European countries, while Austrian, Greek, and Norwegian banks remained solely within their national borders.

5.3.3. Summary statistics

Table 5.3 presents descriptive statistics for the overall sample, and for the pre-crisis period and crisis period, respectively. All variables are defined in the Appendix (Table 5.1). Panel A illustrates mean and median values for bidder-specific characteristics. The mean (median) bidder size in our sample is \$246.617 (\$70.171) billion. Bidders in the crisis period are approximately \$84 billion larger on average than bidders of the pre-crisis period, and their difference is statistical significant at 5% level. In terms of capital levels, bidding banks are significantly more capitalized since 2009, which is consistent with the more stringent regulatory environment and the increased minimum capital requirements of the period. Interestingly, bidders are substantially less profitable (as measured by return on equity) during the crisis, and set aside more money to cover potential losses on loans (as measured by provisions). Lastly, the ratio of non-performing loans to total loans is almost three times higher in the crisis period than before, reflecting one of the main causes for the low profitability levels of the European banking sector in the recent years.

Panel B of Table 5.3 reports several deal-specific characteristics. Days to completion proxy for merger complexity, as more complex deals are associated with a more time-consuming due diligence process (Becher and Campell, 2005). We observe that deals in Europe require a three-month period on average to be materialized, figure that is substantially smaller from what reported in relevant U.S. studies (Leledakis and Pyrgiotakis, 2016). Notably, since 2009, the target firms' markets have become significantly more concentrated. Finally, both before and during the crisis, bidding firms prefer to buy unlisted targets (private stand-alone firms and subsidiaries), and use combinations of cash and stock as the prevailing method of payment.



5.3.4. Abnormal returns estimation

In order to examine the stock market reaction for the proposed mergers of our sample, we employ the standard event study methodology, outlined in Brown and Warner (1985). Hence, we calculate daily abnormal returns using market model estimates, using Eq. (1):

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,t}) \quad (1)$$

Where $AR_{i,t}$ is the abnormal return for the firm i on day t , $R_{i,t}$ is the daily market return for stock i , $R_{m,t}$ is the daily return on Datastream bank index and $t = (-200, -21)$ indexes trading days prior to the merger announcement.⁵⁵ Finally, $\hat{\alpha}_i, \hat{\beta}_i$ are the OLS estimates of the intercept and market beta coefficient, respectively.

For a group of banks N , average abnormal returns are derived using Eq. (2):

$$\overline{AR}_t = \frac{1}{N} \sum_{j=1}^N AR_{i,t} \quad (2)$$

Further, we calculate Cumulative Abnormal Returns (CARs) for each group of banks over an event window (t_1, t_2) using Eq. (3):

$$CAR_{[t_1, t_2]} = \sum_{t=t_1}^{t_2} \overline{AR}_t \quad (3)$$

Consequently, we estimate bidder CARs at the merger announcement date, as well as for 3-, 5-, and 11-days event windows, centered on the announcement date $(-1, +1)$, $(-2, +2)$, $(-5, +5)$.

⁵⁵ To ensure the robustness of our results against several model specifications, we have also employed the market adjusted return model, the mean adjusted returns model, and the market model with the Scholes-Williams beta estimation. In addition, we used other estimation periods $(-300, -51)$ and $(-120, -31)$. The results remained unchanged in all cases.

Table 5.2**Distribution of merging firm by bidders' and targets' country**

The table shows the geographic distribution of completed European bank M&As announced between 1990 and 2016. Both bidders and targets are located in EU-15, plus Norway and Switzerland. The sample consists of 522 mergers between public bidders and public, private, or subsidiary targets. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies. Merger data are collected from Thomson Reuters EIKON database. The definition of the shortcuts is as follows: Austria (AU), Belgium (BE), Denmark (DE), Finland, (FIN), France (FRE), Germany (GE), Greece (GR), Ireland (IR), Italy (IT), Luxemburg (LU), Netherlands (NE), Norway (NO), Portugal (PT), Spain (SP), Sweden (SW), Switzerland (ST), and United Kingdom (UK).

	Target Country																	
Bidder Country	AU	BE	DE	FIN	FRE	GE	GR	IR	IT	LU	NE	NO	PT	SP	SW	ST	UK	Total
Austria	7																	7
Belgium		5			4	2					5		2				1	19
Denmark			27	1				1			1	2			2	1	1	36
Finland				11											1			12
France		1	1		13			1	5	1		1	1			3	2	29
Germany	2	1	1		2	32		1	1	2	2			5		1	2	52
Greece							16											16
Ireland	1					1		4									3	9
Italy					2	1			128	1				1			1	134
Luxemburg					1	1			1		1			1			1	6
Netherlands	1				2	3			2		4							12
Norway												19						19
Portugal											1		7	2				10
Spain						1			2			1	6	29			3	42
Sweden			6	2		1						3			10	1		23
Switzerland	1				2	1				3	2					37	2	48
UK					2			1	2	1	1		1				40	48
Total	12	7	35	14	28	43	16	8	141	8	17	26	17	38	13	43	56	522

Consequently, we estimate bidder CARs at the merger announcement date, as well as for 3-, 5-, and 11- days event windows, centered on the announcement date $(-1, +1)$, $(-2, +2)$, $(-5, +5)$.

To gauge the statistical significance of abnormal returns, we use the standardized cross-sectional test of Boehmer et al., (1991). This test is frequently-used in relevant studies, and adjusts for any potential increases in the variance of abnormal returns (Hagendorff et al., 2008; Asimakopoulos and Athanasoglou, 2013). In detail, a standardized CAR can be written as in Eq. (4):

$$SCAR_{[t_1, t_2]} = \frac{CAR_{[t_1, t_2]}}{\hat{\sigma}_{it}_{[t_1, t_2]}} \quad (4)$$

Where $\hat{\sigma}_{it}$ is estimated using the market model, $\hat{\sigma}_{it} = \sigma^2 \varepsilon_i (t_2 - t_1 + 1)$

This procedure yields the following test statistic:

$$Z = \frac{SCAR_{[t_1, t_2]}}{\frac{1}{N^2} \sum_{i=1}^N (SCAR_{i, [t_1, t_2]} - \overline{SCAR}_{[t_1, t_2]})^2} \quad (5)$$

One issue with abnormal returns is that they tend to exhibit fat tails and they are usually right skewed. Parametric tests like the one of Boehmer et al. (1991) are not well-specified when the assumption of normality is violated. As such, these tests reject too often when testing for positive abnormal returns, and too seldom when testing for negative abnormal returns. To account for this possibility, we use the non-parametric test of Corrado (1989). This test has the advantage that it does not take into account the distribution of the abnormal returns and it makes inferences less sensitive to outliers.



Table 5.3**Summary statistics**

The table summarizes descriptive statistics for a sample of completed European bank M&As announced between 1990 and 2016. Both bidders and targets are located in EU-15, plus Norway and Switzerland. The sample consists of 522 mergers between public bidders and public, private, or subsidiary targets. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. Difference represents the differences in mean and median values between the crisis and the pre-crisis periods. Panel A displays statistics for several bidder-specific variables. All variables are defined in the Appendix (Table 5.1). Panel B provides percentages of deal characteristics. Days to completion and market concentration are also defined in the Appendix. The listing status of the target firm is expressed by % public, % private, and % subsidiary, respectively. Method of payment is expressed by the percentages of cash, stock and both cash and stock deals. Median values are in brackets. Significance for differences in means (medians) is based on the *t*-test (Mann-Whitney test). Significance for differences in medians is based on the Mann-Whitney test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	Whole Period	Pre-Crisis	Crisis	Difference
<i>Panel A: Bidder Characteristics</i>				
Assets (in billion \$)	246.617 [70.171]	219.829 [71.728]	330.808 [59.934]	83.979** [-11.794]
Common equity (in billion \$)	9.276 [3.120]	7.639 [3.243]	14.422 [2.392]	6.783*** [-0.851]
Equity-to-Assets	0.62 [0.47]	0.54 [0.44]	0.88 [0.64]	0.34*** [0.20]***
Return on Assets (ROA)	1.31 [0.94]	1.23 [0.98]	1.56 [0.82]	0.34 [-0.16]**
Return on Equity (ROE)	9.19 [10.75]	12.08 [12.45]	0.12 [5.59]	-11.96*** [-6.86]***
Loans (in billion \$)	125.055 [53.828]	111.900 [52.899]	165.932 [55.658]	54.032*** [2.759]
Deposits (in billion \$)	93.185 [29.830]	83.038 [29.523]	125.968 [33.059]	42.930*** [3.536]
Liquidity	6.43 [1.50]	7.97 [1.55]	1.31 [1.33]	-6.66 [-0.22]***
Provisions (in billion \$)	0.543 [0.345]	0.455 [0.319]	1.060 [0.530]	0.605*** [0.211]***
Efficiency	3.76 [7.26]	3.75 [7.93]	3.81 [4.96]	0.06 [-2.97]***
Non-performing loans -to-Loans	3.70 [2.31]	2.32 [1.92]	6.88 [3.80]	4.56*** [2.88]***
<i>Panel B: Deal Characteristics</i>				
Days to Completion	99.33 [56.00]	101.43 [51.00]	92.75 [67.50]	-8.68 [16.50]
Market Concentration	0.66 [0.68]	0.62 [0.60]	0.79 [0.75]	0.17*** [0.15]***
% Public Targets	19.35	20.71	15.08	
% Private Targets	26.25	26.01	26.98	
% Subsidiary Targets	54.40	53.28	57.94	
% Cash Deals	17.05	15.91	20.63	
% Stock Deals	11.88	12.63	9.52	
% Cash and Stock Deals	42.72	42.42	43.65	
% N/A method of payment	28.35	29.04	26.20	

In the first step, the Corrado's (1989) rank test assigns a rank (K_i) to each firm's abnormal returns for both the event and the estimation period, starting with the rank



of one for the lowest abnormal return. Then, the test compares the ranks in the event period with the expected average rank, under the null hypothesis that abnormal returns are zero. The average expected rank for each bank i is:

$$K_i = 0.5 + T_i / 2 \quad (6)$$

Where K_i the rank for each firm i and time t , and T is the total number of observations for both the estimation and the event period. Followingly, the Corrado's rank test for the event date is estimated as follows:

$$Rank\ Test = \frac{\frac{1}{N} \sum_{i=1}^N (K_{i0} - \bar{K}_i)}{\sqrt{\frac{1}{T} \sum_{t=1}^T \frac{1}{N^2} \sum_{i=1}^N (K_{it} - \bar{K}_i)^2}} \quad (7)$$

Lastly, for multi-day event periods (L), the Rank test is specified as follows:

$$Rank\ Test = \frac{\sum_{l=1}^L \frac{1}{N} \sum_{i=1}^N (K_{i0} - \bar{K}_i)}{\sqrt{\frac{1}{T} \sum_{t=1}^T \frac{1}{N^2} \sum_{i=1}^N (K_{it} - \bar{K}_i)^2}} \frac{1}{\sqrt{L}} \quad (8)$$

5.4. Event study analysis

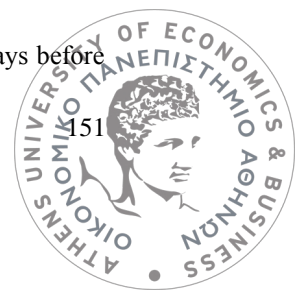
5.4.1. Market reaction at the announcement date

Table 5.4 presents bidder CARs for all 522 bidders of our sample associated with different event period specifications. In order to address our research question, we divide the sample based on whether the deal was announced before or during the crisis, and we compute mean differences between the two sub-periods.

The first column of Table 5.4 reports results for our whole sample. Bidding banks realize zero abnormal returns over the various event windows reported (statistically insignificant according to both the parametric and the non-parametric test). By segmenting the sample based on the two sub-periods, we are able to extract more conclusive results. In fact, bidders in the pre-crisis period (1990 to 2008) experience marginally negative abnormal returns (and statistical significant only according to the non-parametric test). In line with previous studies, market participants are skeptical about acquirers gaining at the announcement of a deal (Tourani-Rad and Van Beek, 1999; Cybo-Ottone and Murgia, 2000; Ismail and Davidson, 2005; Campa and Hernando, 2006, Ekkayokkaya et al., 2009; Beltratti and Paladino, 2013). In economic terms, such bids destroy \$21.72 million in shareholder value for the average bidding bank.⁵⁶

Notably, the results for the crisis period provide a completely different picture. For example, on the acquisition day, mean abnormal returns are in the order of 1.61% and statistical significant at 1%, using both tests. Moreover, CARs for the 3-, 5-, and 11- day periods are 1.96%, 2.56%, and 1.59%, respectively, and statistical significant using both the standardized cross-sectional test and the rank test. Apparently, results of such magnitude are significant not only statistically but also economically. In dollar terms, a mean CAR of 1.96% translates to a shareholder value increase of \$34.20 million for the average bidder. This significant value increase for the average bidding firm suggests that bidder CARs are not skewed towards smaller institutions, as noted in previous studies (Moeller et al., 2004). Most critically, by looking at the last column of Table 5.4, we observe that abnormal returns for deals announced during the crisis are significantly higher compared to deals announced in normal

⁵⁶ We calculate this figure as the product of the bidding firm's market capitalization five days before the announcement date multiplied with the three-day CAR.



times- a result that is significant in all various event windows. The difference in mean CARs between the two periods ranges from 1.74% to 2.62%. These findings confirm that the European sovereign debt crisis has indeed changed the market perception for bank M&As, in the favor of the bidding banks.⁵⁷

So far, the staggering part of the univariate analysis is the sign and magnitude of the bidder CARs in the crisis period.⁵⁸ It is worth mentioning that bidder abnormal returns of about 2% are not frequently observed in bank M&A studies. To get a better insight on this different market response in bank mergers, we illustrate in Figure 5.1 the cumulative abnormal returns over a forty-one days window for pre-crisis and crisis bidders, respectively. As shown in the figure, bidders in the crisis period substantially outperform their pre-crisis peers in all days after the merger announcement. Therefore, in the next parts of our analysis, we emphasize on the potential causes behind this phenomenon.

5.4.2. Bidder CARs, the introduction of the Euro and the different phases of the crisis

During our 27-year examination period, the European banking industry has witnessed considerable structural changes. For example, the creation of the Economic and Monetary Union (EMU), and the introduction of the common currency had a significant impact on the behavior of the European banks (Ekkayokkaya et al., 2009). These changes therefore could have impacted the way market participants respond to the M&As announcements before the outbreak of the European sovereign debt crisis. In addition, different phases of the crisis may have

⁵⁷ We also examined whether the crisis had any effect on the target firms' abnormal returns as well as on the combined bidder-target pair, for a subsample of 101 public acquisitions. Abnormal returns for targets are positive and significant both before and during the crisis, and the mean difference between the two periods is insignificant. For the combined entity, we report a marginal improvement in the crisis period that probably emanates from the significant improvement in bidder CARs.

⁵⁸ It is possible that market model may underestimate the expected returns during a crisis period. For this reason, we repeat the analysis using the Market adjusted returns model. Results were qualitatively similar (See Table 5.2 in Appendix).

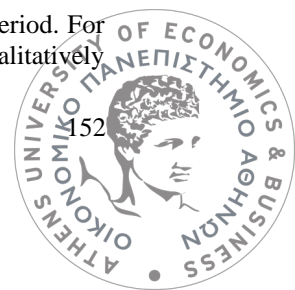


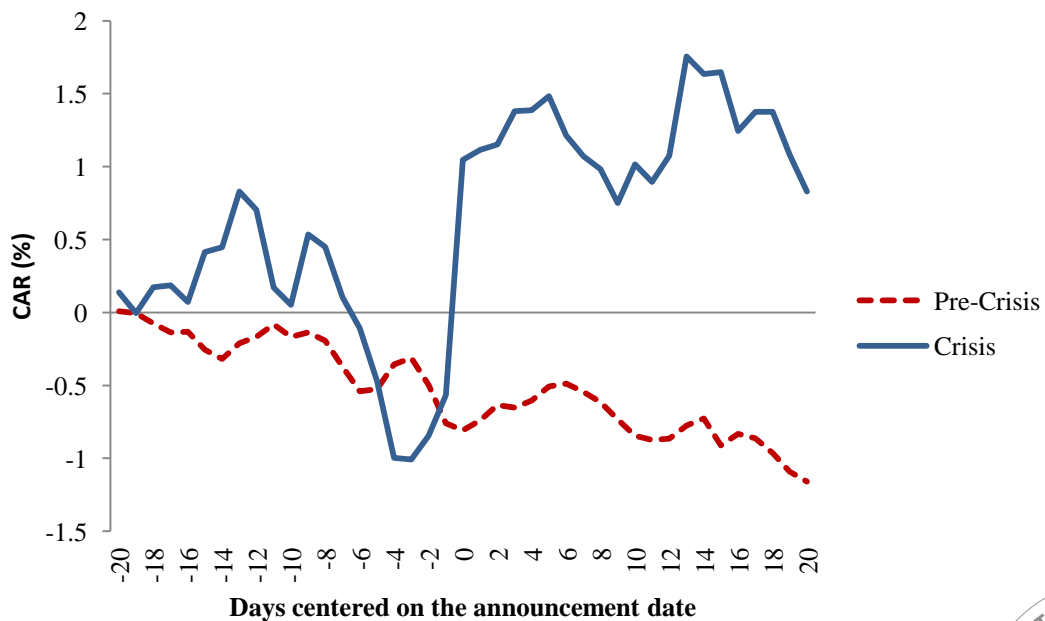
Table 5.4**Bidder CARs around the announcement date**

This table illustrates the bidder cumulative abnormal returns (CARs) around the merger announcement date for a sample of 522 completed European bank M&As announced between 1990 and 2016. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. Abnormal returns are estimated using the market model over 4 different event windows. The estimation period consists of 180 trading days and ends 21 trading days before the event date. The parametric test is the standardized cross-sectional test (StdCsect), and the non-parametric is the Corrado rank test (Rank test). Paired Significance for the difference between mean CARs is based on the *t*-test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

	Whole period <i>n</i> =522	Pre-Crisis <i>n</i> =396	Crisis <i>n</i> =126	Difference
CAR (0)	0.28%	-0.14%	1.61%	1.75%***
StdCsect	(0.22)	(-1.57)	(3.18)***	(<i>t</i> = 4.00)
Rank test	(0.31)	(-1.67)*	(3.55)***	
CAR (-1,+1)	0.20%	-0.36%	1.96%	2.32%***
StdCsect	(0.58)	(-1.26)	(3.83)***	(<i>t</i> = 4.65)
Rank test	(0.29)	(-2.24)**	(4.48)***	
CAR (-2,+2)	0.17%	-0.46%	2.16%	2.62%***
StdCsect	(0.27)	(-1.39)	(3.12)***	(<i>t</i> = 4.00)
Rank test	(-0.32)	(-2.45)**	(3.61)***	
CAR (-5,+5)	0.27%	-0.15%	1.59%	1.74%*
StdCsect	(0.23)	(-1.08)	(2.27)*	(<i>t</i> = 1.88)
Rank test	(-0.78)	(-2.19)**	(2.20)*	

Figure 5.1**Bidder announcement CARs over a (-20, +20) window**

The figure depicts comparative CARs between -20 and +20 days around the merger announcement date for bidders in the pre-crisis, and crisis periods, respectively. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. The dotted red line represents bidder CARs for deals announced in the pre-crisis period. The solid blue line represents bidder CARs for deals announced in the crisis period.



also influenced bidder announcement period gains. Chan-Lau et al. (2015), suggest that the sovereign debt issues of the Euro-periphery countries had a larger impact on the stability of the European banking system over the period 2009-2011. In these years, several Eurozone countries (Greece, Ireland, Portugal, Spain, and Cyprus) were unable to repay or refinance their government debt or bailout their indebted banking systems. Following these events, long-term interest rates for these countries skyrocketed, leading the European authorities to implement a series of financial support measures. In 2012, yields on governments bonds for these countries started to decline, due to the ECB's announcement of unlimited support for all problematic Eurozone member states (Krishnamurthy et al., 2018).

Considering these remarks, we test whether the introduction of the euro or the different phases of the crisis could explain part of the variation in bidder abnormal returns. As such, we divide the pre-crisis subsample into two periods: pre-euro (1990 to 1998), and post-euro (1999 to 2008).⁵⁹ For the crisis period, we also define two separate periods: phase 1 (2009 to 2011) and phase 2 (2012 to 2016).⁶⁰

Panel A of Table 5.5 presents the results for the pre-crisis subsample. Both before and after the introduction of the euro, bidder abnormal returns are negative in general, and significant in some specific event windows. Consistent with Ekkayokkaya et al., (2009), bidder gains have fallen in the post-euro era. However, the difference between the two periods is only significant at the announcement date. Panel B of Table 5.4 shows the results for the crisis period. We observe that in both phases, CARs are positive and significant in almost all event windows. More importantly, mean difference between the two phases of the crisis are insignificant,

⁵⁹ The euro was initially introduced as an electronic currency on January 1, 1999.

⁶⁰ The results remained robust after using other specifications of the times periods. For example, by using the September 6, 2012 as the cut-off (the day when ECB announced the plan to support all Eurozone countries involved in bailout programs), we obtained similar results.

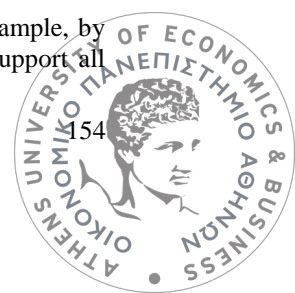


Table 5.5**Bidder CARs in various time periods.**

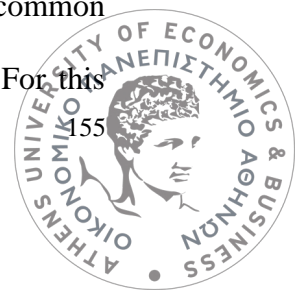
This table illustrates the bidder cumulative abnormal returns (CARs) around the merger announcement date for a sample of 522 completed European bank M&As announced between 1990 and 2016. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. Each period is divided into two separate sub-periods. Pre-euro period is from 1990 to 1998 and post-euro period is from 1999 to 2008. Accordingly, phase 1 period is from 2009 to 2011, and phase 2 period is from 2012 to 2016. Abnormal returns are estimated using the market model over 4 different event windows. The estimation period consists of 180 trading days and ends 21 trading days before the event date. The parametric test is the standardized cross-sectional test (StdCsect), and the non-parametric is the Corrado rank test (Rank test). Paired Significance for the difference between mean CARs is based on the *t*-test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

<i>Panel A: Pre-Crisis</i>			
	Pre-euro (<i>n</i> =175)	Post-euro (<i>n</i> =221)	Difference
CAR (0)	0.18%	-0.40%	-0.58%*
StdCsect	(-0.19)	(-1.90)*	(<i>t</i> = -1.96)
Rank test	(-0.30)	(-2.02)**	
CAR (-1,+1)	-0.19%	-0.49%	-0.30%
StdCsect	(-0.37)	(-1.32)	(<i>t</i> = -0.71)
Rank test	(-1.92)*	(-1.25)	
CAR (-2,+2)	-0.40%	-0.50%	-0.10%
StdCsect	(-0.50)	(-1.44)	(<i>t</i> = -0.20)
Rank test	(-2.03)**	(-1.44)	
CAR (-5,+5)	0.33%	-0.52%	-0.85%
StdCsect	(0.38)	(-1.75)*	(<i>t</i> = -1.19)
Rank test	(-1.10)	(-1.98)**	
<i>Panel B: Crisis</i>			
	Phase 1 (<i>n</i> =44)	Phase 2 (<i>n</i> =82)	Difference
CAR (0)	1.27%	1.80%	0.53%
StdCsect	(1.50)	(2.80)***	(<i>t</i> = 0.40)
Rank test	(1.59)	(3.20)***	
CAR (-1,+1)	1.96%	1.96%	0.00%
StdCsect	(2.30)**	(3.06)***	(<i>t</i> = 0.00)
Rank test	(2.27)**	(3.84)***	
CAR (-2,+2)	2.92%	1.75%	-1.17%
StdCsect	(2.89)***	(1.82)*	(<i>t</i> = -0.64)
Rank test	(3.29)***	(2.06)***	
CAR (-5,+5)	2.29%	1.22 %	-1.07%
StdCsect	(1.81)*	(1.46)	(<i>t</i> = -0.42)
Rank test	(2.01)**	(1.27)	

despite the fact that bidder gains are smaller in magnitude since 2012. It is therefore conceivable that, the crisis effect on bidder gains is evident throughout the whole post-2008 period.

5.4.3. Geographical and product diversification and bidder announcement CARs

As mentioned before, geographical and product diversification were common determinants of bidder abnormal returns in the European financial sector. For this



reason, we classify the sample to: (1) domestic and cross-border acquisitions, and (2) focused and diversified acquisitions. We estimate bidder CARs for this separate subsamples for the whole period, as well as for the pre-crisis and crisis periods, respectively.

Table 5.6 shows bidder CARs by geographical and product diversification. Results for the whole examination period are in line with findings of previous studies. In particular, when we partition our sample geographically, we find that domestic deals significantly create more value to bidding firm's shareholders than cross-border deals (Beitel et al., 2004; Campa and Hernando, 2006). We also compare product diversification strategies with activity focus strategies. The results suggest that mean CARs are higher for cross-product deals than for deals between commercial banks, albeit mean differences between the two subsamples are not statistically different from zero (Lepetit et al., 2004). For the pre-crisis subsample, results are somewhat similar. Bidder of domestic targets experience zero abnormal returns, while bidders of foreign targets realize negative and statistical significant CARs. Mean differences between these two groups are statistical significant for the 5- and 11- days event windows. In addition, bank to bank deals exhibit statistically lower abnormal returns than diversified deals, in almost all event windows. These results suggest that in normal times, geographical focus and financial conglomeration could be sources of value creation for the bidding banks. Since 2009, firms that expand domestically and within the banking industry realize positive and statistical significant abnormal returns, while results for foreign and/or cross-product bids are essentially zero. In both cases, mean differences are insignificant, indicating that geographical and product diversification do not explain the variation in bidder CARs in the crisis

Table 5.6**Bidder CARs by geographical and product diversification**

This table illustrates the bidder cumulative abnormal returns (CARs) around the merger announcement date for a sample of 522 completed European bank M&As announced between 1990 and 2016. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. The sample is further divided based geographical and product diversification. Abnormal returns are estimated using the market model over 4 different event windows. The estimation period consists of 180 trading days and ends 21 trading days before the event date. The parametric test is the standardized cross-sectional test (StdCsect), and the non-parametric is the Corrado rank test (Rank test). Paired Significance for the difference between mean CARs is based on the *t*-test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

	Geographic diversification			Product Diversification		
	Domestic <i>n</i> =391	Cross-border <i>n</i> =131	Difference	Focused <i>n</i> =410	Diversified <i>n</i> =112	Difference
<i>All</i>						
CAR (0)	0.47%	-0.29%	0.76% *	0.25%	0.39%	-0.14%
StdCsect	(0.98)	(-1.67)*	(<i>t</i> = 1.74)	(-0.57)	(1.78)*	(<i>t</i> = -0.28)
Rank test	(1.20)	(-1.63)		(-0.97)	(0.95)	
CAR (-1,+1)	0.47%	-0.61%	1.08% **	0.11%	0.52%	-0.41%
StdCsect	(1.50)	(-2.09)**	(<i>t</i> = 2.16)	(-0.31)	(1.91)*	(<i>t</i> = -0.77)
Rank test	(1.43)	(-2.12)**		(-0.15)	(1.00)	
CAR (-2,+2)	0.58%	-1.03%	1.61% **	0.14%	0.31%	-0.17%
StdCsect	(1.48)	(-3.06)***	(<i>t</i> = 2.46)	(-0.31)	(1.16)	(<i>t</i> = -0.25)
Rank test	(1.31)	(-3.13)***		(-0.52)	(0.29)	
CAR (-5,+5)	0.88%	-1.55%	2.43% ***	0.36%	-0.03%	0.39%
StdCsect	(1.84)*	(-3.71)***	(<i>t</i> = 2.68)	(0.33)	(-0.15)	(<i>t</i> = 0.40)
Rank test	(1.09)	(-3.68)***		(-0.22)	(-1.42)	
<i>Pre-crisis</i>	<i>n</i> =283	<i>n</i> =113		<i>n</i> =296	<i>n</i> =100	
CAR (0)	-0.05%	-0.37%	0.32%	-0.29%	0.31%	-0.60% *
StdCsect	(-0.71)	(-2.98)**	(<i>t</i> = 0.98)	(-2.42)**	(1.37)	(<i>t</i> = -1.77)
Rank test	(-0.78)	(-1.87)*		(-2.23)**	(0.51)	
CAR (-1,+1)	-0.19%	-0.79%	0.60%	-0.65%	0.49%	-1.14% **
StdCsect	(0.15)	(-3.08)***	(<i>t</i> = 1.29)	(-2.92)**	(1.66)*	(<i>t</i> = -2.35)
Rank test	(-0.91)	(-2.65)***		(-2.99)***	(0.69)	
CAR (-2,+2)	-0.11%	-1.33%	1.22% **	-0.69%	0.25%	-0.94% *
StdCsect	(0.14)	(-4.54)***	(<i>t</i> = 2.25)	(-2.00)**	(0.84)	(<i>t</i> = -1.66)
Rank test	(-0.44)	(-3.79)***		(-2.86)***	(0.00)	
CAR (-5,+5)	0.44%	-1.62	2.06% ***	-0.23%	0.09%	0.32%
StdCsect	(0.58)	(-3.94)***	(<i>t</i> = 2.66)	(-1.16)	(-0.15)	(<i>t</i> =0.39)
Rank test	(-0.28)	(-3.57)***		(-1.83)*	(-1.37)	
<i>Crisis</i>	<i>n</i> =108	<i>n</i> =18		<i>n</i> =114	<i>n</i> =12	
CAR (0)	1.84%	0.24%	1.60%	1.68%	1.03%	0.65%
StdCsect	(3.21)***	(0.58)	(<i>t</i> = 0.89)	(2.88)***	(1.39)	(<i>t</i> = 0.30)
Rank test	(3.65)***	(0.49)		(3.25)***	(1.46)	
CAR (-1,+1)	2.20%	0.55%	1.65%	2.09%	0.76%	1.33%
StdCsect	(3.92)***	(0.82)	(<i>t</i> = 0.99)	(3.73)***	(0.95)	(<i>t</i> = 0.67)
Rank test	(4.33)***	(1.22)		(4.30)***	(1.11)	
CAR (-2,+2)	2.37%	0.90%	1.47%	2.30%	0.85%	1.45%
StdCsect	(3.01)***	(0.94)	(<i>t</i> = 0.59)	(2.95)***	(0.99)	(<i>t</i> = 0.49)
Rank test	(3.32)***	(1.45)		(3.67)***	(0.92)	
CAR (-5,+5)	2.04%	-1.10%	3.14%	1.87%	-1.07%	2.94%
StdCsect	(2.59)***	(-0.41)	(<i>t</i> = 0.91)	(2.36)**	(-0.05)	(<i>t</i> = 0.72)
Rank test	(2.61)***	(-0.59)		(2.43)**	(-0.46)	

period. However, the small sample size of cross-border and cross-product deals may rob the statistical power of these inferences.

5.5. Multivariate regression analysis

The results of the event study analysis indicate sizeable variation in bidder abnormal returns across periods. In fact, announcement CARs are significantly higher during the crisis than before. Hence, we conduct several cross-sectional regressions to investigate in-depth the source of value creation for bids announced post-2008. The dependent variable in all these regressions is the bidder five-day CARs centered on the merger announcement date.⁶¹ Our variables of interest concern the characteristics of the target firm's market and the financial condition of the bidding bank. We examine whether financially healthy banks that expand in more concentrated and vulnerable countries experience higher abnormal returns, and if so, when. We also use several other control variables as suggesting by existing literature focusing on acquirer returns, like method of payment and listing status of the target firm. Lastly, we include bidder country fixed effects in some model specifications.

We employ our regression analysis on three different samples: the entire sample of 522 deals (whole examination period); the sample of 396 deals (pre-crisis period); and the sample of 126 deals (crisis period). We utilize this classification in order to investigate whether the same variables have different impact on bidder CARs before and during the crisis. Further, to minimize the possibility that our results may be influenced by outliers, we winsorize all continuous variables at 1% and 99% level. Significance of coefficient estimates is based on heteroskedasticity consistent standard errors (White, 1980).

⁶¹ We use the 5-day window as in Hagendorff et al. (2008), since it offers the highest value of abnormal returns. However, results remained qualitatively similar when we use other event windows as the dependent variable.

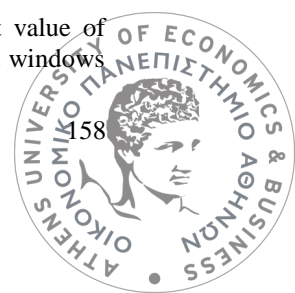


Table 5.7**Regression analysis of bidder CARs for the whole sample**

This table summarizes regression results for a sample of completed European bank M&As announced between 1990 and 2016. Both bidders and targets are located in EU-15, plus Norway and Switzerland. The sample consists of 522 mergers between public bidders and public, private, or subsidiary targets. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies. In each regression, the dependent variable is the bidder five-day CARs, centered on the announcement date. Acquirer country fixed effects are included in the analysis. All independent variables are defined in the Appendix (Table 5.1). All continuous variables are winsorized at 1% and 99% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables of Interest</i>						
Crisis Dummy	0.019*** (3.30)	0.018*** (2.87)	0.014* (1.86)	0.016*** (3.86)	0.018*** (3.56)	0.013* (2.09)
Market Concentration		0.005 (0.40)	0.006 (0.41)		-0.016 (-1.39)	-0.011 (-0.96)
PIIGS		-0.004 (-0.92)	-0.005 (-0.82)		-0.003 (-0.38)	-0.000 (-0.04)
Bidder NPLs			-0.002* (-1.78)			-0.002** (-2.86)
Bidder Efficiency			-0.000 (-1.38)			-0.000 (-0.99)
Bidder Liquidity			-0.003 (-0.79)			-0.001 (-0.49)
<i>Control Variables</i>						
Domestic	0.008* (1.79)	0.009* (1.92)	0.009* (1.67)	0.009* (1.93)	0.009* (1.97)	0.010** (2.22)
Product Focus	-0.011** (-2.19)	-0.010** (-2.16)	-0.009 (-1.47)	-0.010 (-1.74)	-0.009 (-1.72)	-0.007 (-1.12)
Cash	0.004 (0.77)	0.004 (0.82)	0.007 (0.97)	0.007 (1.44)	0.007 (1.49)	0.008 (1.17)
Stock	-0.003 (-0.34)	-0.003 (-0.35)	0.003 (0.25)	-0.001 (-0.12)	-0.000 (-0.07)	0.006 (0.50)
Bidder Size	-0.003** (-2.37)	-0.003** (-2.36)	-0.001 (-0.36)	-0.002*** (-4.12)	-0.002*** (-3.33)	0.000 (0.25)
Bidder ROE	-0.000 (-1.64)	-0.000 (-1.59)	-0.001** (-2.40)	-0.000 (-1.11)	-0.000 (-0.96)	-0.001* (-2.08)
Days to Completion	-0.000 (-0.71)	-0.000 (-0.61)	-0.000 (-0.83)	-0.000 (-0.57)	-0.000 (-0.62)	-0.000 (-0.92)
Private	-0.010 (-1.36)	-0.009 (-1.26)	-0.002 (-0.23)	-0.008 (-1.04)	-0.008 (-1.06)	-0.003 (-0.31)
Subsidiary	-0.005 (-0.74)	-0.005 (-0.67)	0.003 (0.31)	-0.002 (-0.35)	-0.002 (-0.33)	0.004 (0.55)
Constant	0.036** (2.11)	0.034* (1.86)	0.019 (0.74)	0.031** (2.82)	0.040*** (3.87)	0.014 (0.93)
Country FE	No	No	No	Yes	Yes	Yes
Adjusted R ²	0.058	0.058	0.043	0.039	0.038	0.014
N	522	522	347	522	522	347

5.5.1. Regressions of bidder CARs for the whole sample

Table 5.7 present the regression results for the whole sample of 522 M&As. Looking at our variables of interest, we observe that the crisis dummy is positive and statistical significant in all six models. The magnitude of its coefficients suggests that the positive effect of the crisis on the average bidding bank ranges from 1.3% to 1.9%. Therefore, this effect is consistently positive for our whole period, even after controlling for several bidder-and deal-specific characteristics. In addition, bidder NPLs are negative and significant, indicating that banks with less problematic loan portfolios engage in more value-creating acquisitions throughout the whole examination period.⁶²

A handful of the remaining control variables bear also statistical significant coefficients. In line with the univariate analysis, banks that expand domestically realize higher abnormal returns compared to cross-border acquisitions (Beitel et al., 2004; Campa and Hernando, 2006). Moreover, as shown in models 1 and 2, product-focused deals destroy value for the bidding firms shareholders (Lepetit et al., 2004). Bidding firm's size is also negatively correlated with announcement period gains. This finding indicates that small banks gain more from M&As, since large institutions should have achieved economies of scale and scope prior to the acquisition (DeLong and DeYoung, 2007). Adjusted R^2 ranges from 1.4% to 5.8%, finding that is typically observed in cross-sectional regressions of bidder CARs (DeLong, 2003).

⁶² In some models the number of observations is decreased, due to the fact that data for non-performing loans are not available for all firms in Worldscoop database.



Table 5.8**Regression analysis of bidder CARs before and during the crisis**

This table summarizes regression results for a sample of completed European bank M&As announced between 1990 and 2016. The sample is segmented based on whether the deal was announced before or during the crisis. Both bidders and targets are located in EU-15, plus Norway and Switzerland. The sample consists of 522 mergers between public bidders and public, private, or subsidiary targets. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies. In each regression, the dependent variable is the bidder five-day CARs, centered on the announcement date. Acquirer country fixed effects are also included in the analysis. All independent variables are defined in the Appendix (Table 5.1). All continuous variables are winsorized at 1% and 99% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	Pre-Crisis			Crisis		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables of Interest</i>						
Market Concentration		-0.023** (-2.21)	-0.026** (-2.50)		0.174 (1.31)	0.167 (1.45)
PIIGS			-0.006 (-0.93)			0.028*** (4.98)
Bidder NPLs	-0.003 (-1.57)	-0.003 (-1.62)	-0.003 (-1.65)	-0.002*** (-3.08)	-0.003*** (-5.09)	-0.003*** (-5.02)
Bidder Efficiency	-0.000 (-0.41)	0.000 (0.05)	0.000 (0.10)	-0.000* (-1.79)	-0.001* (-1.93)	-0.001* (-1.93)
Bidder Liquidity	-0.002 (-0.84)	-0.000 (-0.07)	-0.000 (-0.06)	0.009 (0.46)	0.012 (0.40)	0.012 (0.39)
<i>Control Variables</i>						
Domestic	0.008 (1.50)	0.011** (2.80)	0.011*** (2.94)	0.012 (0.71)	0.010 (0.39)	0.006 (0.23)
Product Focus	-0.008 (-1.30)	-0.003 (-0.44)	-0.003 (-0.40)	0.001 (0.07)	-0.010 (-0.50)	-0.008 (-0.39)
Cash	0.006 (0.75)	0.005 (0.65)	0.006 (0.80)	-0.008 (-0.69)	-0.006 (-1.63)	-0.006* (-1.96)
Stock	0.006 (0.49)	0.011 (0.94)	0.011 (0.97)	0.005 (0.13)	-0.000 (-0.00)	-0.001 (-0.02)
Bidder Size	0.000 (0.12)	0.001 (1.17)	0.002 (1.21)	-0.002 (-0.70)	-0.001 (-0.38)	-0.001 (-0.39)
Bidder ROE	-0.000 (-0.97)	-0.000 (-0.70)	-0.000 (-0.68)	-0.000*** (-9.17)	-0.000*** (-6.78)	-0.000*** (-6.58)
Days to Completion	-0.000 (-0.91)	-0.000 (-0.45)	-0.000 (-0.41)	-0.000 (-0.18)	-0.000 (-0.12)	-0.000 (-0.15)
Private	0.001 (0.12)	0.003 (0.25)	0.003 (0.28)	-0.012 (-0.58)	-0.017 (-1.07)	-0.017 (-1.24)
Subsidiary	0.003 (0.27)	0.003 (0.33)	0.004 (0.38)	0.012 (0.67)	0.012 (0.68)	0.010 (0.57)
Constant	0.009 (0.31)	-0.003 (-0.15)	-0.000 (-0.02)	0.027 (0.50)	-0.108 (-0.86)	-0.113 (-1.02)
Country FE	No	Yes	Yes	No	Yes	Yes
Adjusted R ²	0.000	0.000	0.000	0.108	0.100	0.091
N	242	242	242	105	105	105

5.5.2. Regression of bidder CARs before and during the crisis

We now move our analysis in examining regression results for the pre-crisis and crisis periods, respectively. Table 5.8 presents the regression estimates for this analysis. At a first glance, we observe that our independent variables behave differently across the two time periods. During the pre-crisis period, domestic acquisitions significantly outperform cross-border deals, as indicated at the univariate level. Product-focused deals have also a negative coefficient, albeit not statistically significant. Further, in models 2 and 3, market concentration bears a negative and statistically significant coefficient. We would thus argue that abnormal returns in normal periods are lower when banks expand into more concentrated banking systems (such as the small EU periphery countries). Overall, the explanatory power of our models for the pre-crisis period is extremely low, due to the inclusion of many independent variables that do not have a significant impact on bidder abnormal returns.

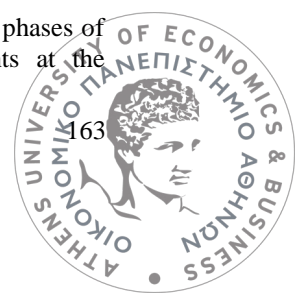
The last three columns of Table 5.8 report evidence that is more meaningful for the purpose of our study. In all our regressions, we indicate a negative association between abnormal returns and bidder NPLs (significant at 1% level). This result confirms that during a crisis period, market participants reward bidding banks that are in a better financial condition relative to their peers. Moreover, bidder efficiency is negative and significant at 10% in all our specifications. This variable is defined as the ratio of operating expenses to operating income at the year-end prior to the merger announcement. Hence, the higher the value of this ratio, the less efficient is the bank. Consequently, the negative sign implies that less efficient banks experience lower abnormal returns since 2009. This finding is also supportive of our argument, that during the European sovereign crisis period, bidder abnormal returns increase

with the financial status of the bidding bank. Next, we also observe that the level of financial distress for the target country (PIIGS) has a positive effect on bidder CARs (and significant at 1% level). In fact, banks that expand in the weak EU periphery countries experience 2.8% higher abnormal returns on average, than banks targeting firms in countries like Germany, or the UK. We argue that this result may reflect lower competitive pressures in the M&As market in these countries. As Gibson et al. (2016) suggest, the banking systems of these five member states are over-indebted and many institutions are in the verge of failure. In such an environment, many insolvent firms could become potential targets merely to survive. This scenario creates opportunities for the financially healthy banks to achieve a dominant position in these markets by acquiring the less solvent institutions in favorable terms and increase their market share (Molyneux et al., 2014). Lastly, the sign of market concentration turns from negative (in the pre-crisis period), to positive, but not statistical significant. Adjusted R^2 is considerably higher compared to pre-crisis regressions, ranging from 9.1% to 10.8%. This finding indicates that our variables of interest explain considerably more of the variation of abnormal returns since 2009.⁶³

5.6. Has the crisis impacted CARs at the completion date?

In the M&As literature, empirical evidence focuses almost entirely on announcement period returns. However, in their early study, Desai and Stover (1985), examine abnormal returns around the day when the Federal Reserve Board's (FRB) regulatory approval is granted to the proposed merger partners. Their findings suggest that bidders gain at the announcement of the deal, but also gain when the deal is effectively successful. The authors attribute such findings to the removal of the

⁶³ We have also included dummies to capture the introduction of the euro and the different phases of the crisis. Consistent with the univariate analysis, both have insignificant coefficients at the multivariate level.



uncertainty regarding the materialization of the proposed merger. In a much recent study for the European market for corporate control, Beltratti and Paladino (2013), suggest that in times of crisis, investors may choose to react at the completion rather than the announcement date, due to the increased likelihood of an unsuccessful termination of the deal. They provide evidence consistent with this assumption, since bidder abnormal returns at the completion date were positive and significant, whereas announcement returns were essentially zero.

Before examining the abnormal returns at the deal completion date, we test whether the argument of increased uncertainty for the crisis period is valid in our sample. In line with Faccio et al. (2006), we identify acquisitions that were announced as completed acquisitions at the initial announcement date, and we eliminate such deals from the sample (178 out of 522 observations, where 137 were in the pre-crisis period, and 41 in the crisis period, respectively). Hence, for the remaining 344 deals, there was uncertainty regarding the final materialization of the proposed merger (259 in the pre-crisis period, and 85 in the crisis period, respectively). From the Thomson Reuters EIKON database, we obtain a sample of 140 announced but not completed mergers over the same period (113 in the pre-crisis period, and 27 in the crisis period, respectively). As such, the probability of acquisition success in the pre-crisis period is $(259 / (259 + 113)) = 69.62\%$, and in the crisis period is $(85 / (85 + 27)) = 75.89\%$. Therefore, since 2009, the probability of a successful termination of a proposed bank merger is higher than before, suggesting that uncertainty is slightly decreased over these years. To our point of view, this result is supportive of our argument for lower competition in the M&As market during a financial crisis. In a distressed economic environment with many potential targets, bidding banks can be more selective in their acquisition strategies, by carefully evaluating all their possible

Table 5.9**CARs around the completion date**

This table illustrates the bidder cumulative abnormal returns (CARs) around the merger completion date for a sample of 522 completed European bank M&As announced between 1990 and 2016. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. Panel A reports bidder completion CARs for the whole sample, whereas Panels B and C report completion CARs for those bidders with positive and negative announcement CARs, respectively. Abnormal returns are estimated using the market model over 4 different event windows. The estimation period consists of 180 trading days and ends 21 trading days before the event date. The parametric test is the standardized cross-sectional test (StdCsect), and the non-parametric is the Corrado rank test (Rank test). Paired Significance for the difference between mean CARs is based on the *t*-test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

	Whole period	Pre-Crisis	Crisis	Difference
<i>Panel A: All</i>	<i>n=522</i>	<i>n=396</i>	<i>n=126</i>	
CAR (0)	0.34%	0.21%	0.77%	0.56%**
StdCsect	(3.23)***	(1.84)*	(3.01)***	(<i>t</i> = 1.96)
Rank test	(2.80)***	(1.43)	(3.33)***	
CAR (-1,+1)	0.15%	-0.09%	0.89%	0.98%**
StdCsect	(2.10)**	(0.32)	(3.57)***	(<i>t</i> = 2.30)
Rank test	(1.05)	(-0.48)	(3.02)***	
CAR (-2,+2)	0.02%	-0.17%	0.62%	0.79%
StdCsect	(1.64)	(-0.96)	(3.07)***	(<i>t</i> = 1.59)
Rank test	(0.64)	(0.66)	(2.53)**	
CAR (-5,+5)	0.06%	-0.52%	1.88%	2.30%***
StdCsect	(-0.17)	(-1.48)	(2.03)***	(<i>t</i> = 2.59)
Rank test	(-1.49)	(-2.41)**	(1.19)	
<i>Panel B: Positive Announcement</i>	<i>n=257</i>	<i>n=171</i>	<i>n=86</i>	
CAR (0)	0.72%	0.51%	1.14%	0.63%
StdCsect	(4.61)***	(3.27)***	(3.29)***	(<i>t</i> = 1.42)
Rank test	(4.37)***	(3.13)***	(3.49)***	
CAR (-1,+1)	1.19%	0.79%	1.99%	1.20%**
StdCsect	(5.52)***	(3.23)***	(5.23)***	(<i>t</i> = 2.13)
Rank test	(4.98)***	(3.25)***	(4.29)***	
CAR (-2,+2)	0.93%	0.60%	1.59%	0.99%
StdCsect	(4.27)***	(2.50)**	(3.97)***	(<i>t</i> = 1.60)
Rank test	(3.20)***	(1.89)*	(3.02)***	
CAR (-5,+5)	0.83%	0.41%	1.66%	1.25%
StdCsect	(2.71)***	(1.42)	(2.70)***	(<i>t</i> = 1.48)
Rank test	(1.49)	(0.41)	(2.01)**	
<i>Panel C: Negative Announcement</i>	<i>n=265</i>	<i>n=225</i>	<i>n=40</i>	
CAR (0)	-0.02%	-0.02%	-0.03%	-0.01%
StdCsect	(-0.33)	(-0.66)	(0.52)	(<i>t</i> = -0.01)
Rank test	(-0.40)	(-0.74)	(0.77)	
CAR (-1,+1)	-0.87%	-0.76%	-1.48%	-0.72%
StdCsect	(-3.15)***	(-3.05)***	(-0.93)	(<i>t</i> = -1.10)
Rank test	(-3.64)***	(-3.41)***	(-1.40)	
CAR (-2,+2)	-0.87%	-0.77%	-1.46%	-0.69%
StdCsect	(-2.06)**	(-2.30)**	(-0.02)	(<i>t</i> = -0.81)
Rank test	(-2.39)**	(-2.54)**	(-0.20)	
CAR (-5,+5)	-0.68%	-1.22%	2.35%	3.57%*
StdCsect	(-2.82)***	(-3.26)***	(-0.02)	(<i>t</i> = 1.88)
Rank test	(-3.74)***	(-3.65)***	(-1.09)	

options. Under these circumstances, a bidder withdrawal should be a less likely scenario.

We now move on examining bidder abnormal returns around the merger completion date. Taking into consideration that uncertainty decreased during the crisis period, we would expect to find lower abnormal returns at the completion date. However, as shown in Panel A of Table 5.9, bidder CARs are significantly higher during the crisis period than before, in almost all event windows. Hence, we conjecture that the differential likelihood of acquisition success between the two periods does not explain this difference in completion CARs.

In order to examine why completion CARs also increase since 2009, we follow a different approach. If the markets are efficient, then all investors' expectations regarding the merger should be impounded in the stock price at the announcement (Dodd and Ruback, 1977). If for any reason, investors react also at the completion of a merger, then it is likely that the sign of this reaction will be the same with the sign at the announcement. In other words, if market participants anticipate a deal as value-creating at the announcement, they may also do so at the completion. This argument should be valid unless something changes the investors' perception for the deal in the time interval between the announcement and completion dates. For example, if the due-diligence process reveals unfavorable information regarding the financial condition of the target firm, it is likely that a previously-anticipated value-creating deal will experience negative abnormal returns at the completion. However, in this case, it is also likely that the bidding firm will withdraw its bid (Jacobsen, 2014). Therefore, the willingness of the bidding firm to complete its offer should send positive signs to the market regarding the outcome of the due-diligence process.



To test the aforementioned argument, we examine whether there is significant relation between announcement and completion CARs. Panels B and C of Table 5.9 partition the sample based on whether the market reaction at the announcement was positive or negative. Our preliminary results indicate a consistent positive relation between announcement and completion CARs, irrespective of the time period. Deals that experienced a positive revaluation in their stock price at the announcement, earn significantly positive returns at the completion, and vice versa. By looking at the mean differences between the two periods, we find weak support that the crisis has indeed altered the investors' perception at the deal completion date, after controlling for announcement period gains.

To pursue this theme a bit further, we estimate multivariate regressions where the dependent variable is the bidder five-day CARs centered on the completion date. In these model specifications, our main variables of interest are the crisis dummy and the announcement period gains. The results are reported in Table 5.10. In models 1 and 4, crisis dummy has a positive and statistical significant coefficient at 5%, and 10%, respectively, indicating that completion CARs have increased as a result of the crisis. However, by including the announcement CARs in our regressions, the crisis dummy loses any significance. On the contrary, announcement CARs bear positive and highly statistical significant coefficients in all models (at 1% level). Furthermore, the explanatory power of our models is increased with the addition of this variable. For example, the Adjusted R^2 increased from 2.3% in model 1 to 15.2% in model 2, only due to the inclusion of announcement CARs as a predictor. The results are also economically significant. In fact, an announcement CAR of 1% is associated with an additional reaction at the completion date of around 0.30%.



Table 5.10**Regression analysis of bidder CARs at the completion date**

This table summarizes regression results for a sample of completed European bank M&As announced between 1990 and 2016. Both bidders and targets are located in EU-15, plus Norway and Switzerland. The sample consists of 522 mergers between public bidders and public, private, or subsidiary targets. Bidders are commercial banks, bank holding companies, and credit institutions, while targets could also be insurance firms, security brokers, and real estate companies. In each regression, the dependent variable is the bidder five-day CARs, centered on the completion date. Acquirer country fixed effects are also included in the analysis. All independent variables are defined in the Appendix (Table 5.1). All continuous variables are winsorized at 1% and 99% level. Significance is based on White (1980) heteroskedasticity consistent standard errors. The t-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables of Interest</i>						
Crisis Dummy	0.011** (2.37)	0.005 (1.23)	0.009 (1.54)	0.010* (1.93)	0.005 (1.04)	0.009 (1.31)
Announcement CARs		0.322*** (5.64)	0.258*** (3.71)		0.314*** (6.06)	0.236*** (4.59)
<i>Control Variables</i>						
Domestic	0.000 (0.06)	-0.002 (-0.59)	0.002 (0.32)	0.001 (0.30)	-0.002 (-0.49)	0.003 (0.80)
Product Focus	-0.000 (-0.03)	0.003 (0.81)	0.005 (0.96)	-0.001 (-0.14)	0.003 (0.81)	0.005 (1.24)
Cash	-0.002 (-0.41)	-0.003 (-0.70)	-0.000 (-0.06)	-0.000 (-0.02)	-0.002 (-0.58)	0.001 (0.20)
Stock	0.009 (1.50)	0.010* (1.68)	0.011 (1.52)	0.010 (1.18)	0.010 (1.05)	0.012 (1.38)
Bidder Size	-0.002 (-1.63)	-0.001 (-0.88)	-0.000 (-0.23)	-0.001 (-1.46)	-0.001 (-0.70)	0.000 (0.42)
Bidder ROE	0.000* (1.78)	0.000** (2.18)	0.001* (1.91)	0.000*** (3.79)	0.001*** (6.22)	0.001*** (7.31)
Days to Completion	0.000 (0.66)	0.000 (0.99)	0.000 (0.45)	0.000 (0.43)	0.000 (0.64)	0.000 (0.55)
Private	-0.001 (-0.15)	0.002 (0.34)	0.001 (0.13)	-0.002 (-0.34)	0.001 (0.17)	0.001 (0.30)
Subsidiary	-0.005 (-0.83)	-0.003 (-0.55)	-0.002 (-0.24)	-0.005 (-0.81)	-0.004 (-0.67)	-0.000 (-0.06)
Market Concentration			-0.022 (-1.62)			-0.040*** (-3.23)
PIIGS			-0.006 (-1.06)			-0.002 (-0.41)
Bidder NPLs			-0.001 (-1.62)			-0.001 (-1.43)
Bidder Efficiency			-0.000 (-0.69)			-0.000 (-0.85)
Bidder Liquidity			-0.002 (-0.79)			-0.000 (-0.12)
Constant	0.012 (0.82)	0.000 (0.03)	0.015 (0.69)	0.010 (0.90)	0.000 (0.00)	0.011 (0.72)
Country FE	No	No	No	Yes	Yes	Yes
Adjusted R ²	0.023	0.152	0.121	0.023	0.146	0.122
N	522	522	347	522	522	347

Overall, our analysis indicates that the crisis does not have a direct impact on bidder completion CARs. We provide strong evidence that completion CARs are positive when announcement CARs are also positive. Considering the announcement period gains are significantly higher during the crisis period, it is well-justified why completion CARs are also higher over the same period. We therefore conclude that any investors' reaction at the completion date is an additional reward (punishment) for those deals that were anticipated as value-creating (value-destroying) at the announcement.

5.7. Conclusion

In this paper we examine whether and why the market perception towards bank M&As changed during the European sovereign debt crisis. In support of the emerging view that crisis have changed the landscape of the market for corporate control, we find that European bank acquirers realize positive announcement returns of unprecedented magnitude. In fact, bidder CARs around the announcement date are in the order of 2%, figure that in monetary terms translates into a value increase of about \$34 million for the average bidder. On the contrary, before the crisis, bidding banks experienced marginally negative returns. To this extend, the European sovereign debt crisis constitutes an opportunity for banks to engage in value-creating acquisitions.

To test more formally the effect of the crisis on the financial performance of bidding banks, we conduct several regressions. In general, we document that the value increases are related to the bidding firm's financial status and to the characteristics of the target firm's country. More specifically we find that abnormal returns are higher for more efficient banks with lower NPLs ratios, and for those banks that expand into weak Eurozone countries. These results are supportive of our arguments that during

crisis periods, the announcement of an acquisition may be interpreted as a sign of financial health, and that bidding banks may be also benefited from the lower competitive pressures in the market for corporate control.

A question that remains open for future research is whether this value creation in bank M&As will last in the foreseeable future. If the crisis created these opportunities for expansion, it is quite debatable whether they will continue to exist when the economic recession is over. Further investigation will be also required to identify whether these acquisition strategies have resulted in operating efficiency improvements. In the meantime, bank managers who evaluate their strategic position within the EU may wish to consider M&As as a potential value-creation option.

Chapter 6

Conclusion

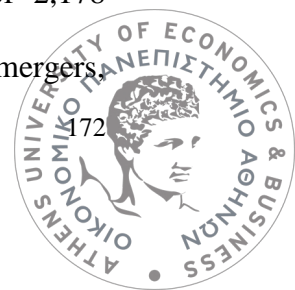


6.1. Concluding remarks

This thesis examines the market response to bank M&As in the U.S. and the EU. The research questions investigated were primarily motivated by the lack of empirical evidence regarding the effect of the financial crisis of 2007-2009 and the European sovereign debt crisis in bank mergers. In addition, we were also inspired by the lack of conclusive evidence regarding the merger-related shareholder gains of acquiring firms. To this extend, we add to the existing literature by analyzing several previously-unexamined issues.

The first objective of this thesis is to examine the effect of the Dodd-Frank Act on U.S. bank M&As. The DFA was the federal response to the financial crisis of 2008, and its main objective was to address the TBTF problem. The new regulatory regime attempts a shift from the “one size fits all” approach, by providing several regulatory exemptions for small banks. At the same time, the new compliance costs appear to be more burdensome for small institutions, providing motives for M&As. In this regard, we predict that small banks mergers in the post-DFA era should create more value than before since these firms: (1) have the necessity to merge to achieve economies of scale through compliance cost savings (2) are exempt from the new activity-based restrictions. In line with our predictions, we find robust evidence that small bank M&As are value-creating opportunities in the post-DFA era. Using the Difference-in-Differences approach, we conclude that such deals create significantly more value after the DFA’s passage than before. Moreover, our multivariate analysis suggests that these gains are positively-related to the potential for regulatory cost savings.

The second objective of this research is to investigate the role of the target firm’s listing status in bank M&As. To do so, we utilize a large sample of 2,178 acquisitions by U.S. banks. We find, in line with studies for nonfinancial mergers,



that acquirers of private targets earn significantly more than acquirers of public targets. This difference is robust even if we account for changes in federal regulation, geographical scope, method of payment, firms' size, among other factors. Furthermore, we investigate whether financial advisors could influence bidder gains and explain this difference. We expect that the use of financial advisors should be more beneficial in the case of private targets, since these firms do not provide information for their financial condition to the public. In fact, when acquirers in private offers do not employ an advisor, they experience negative returns, comparable with the ones for public offers. On the contrary, when they use financial advisory services, abnormal returns are large and positive, on average. Interestingly, in public bids, the use of an advisor is negatively correlated with bidder abnormal returns.

Finally, in the last objective of this study is to analyze the effects of the European sovereign debt crisis in bank M&As. We conjecture that in a financially distressed environment, an acquisition announcement may be viewed as a sign of financial health, since many banks in the EU area experienced large drops in their share prices and suffer from solvency issues. Following this argument, we examine a sample of 522 European bank M&As from 1990 to 2016, and we find strong evidence that acquirers earn significantly higher abnormal returns during the crisis than before. In fact, this different market response indicates that the average bidding bank creates \$34 million in shareholder value since 2009, while in the pre-crisis period, the average bank destroyed shareholder value in the scale of \$21 million. Further, we conduct multivariate regression analyses to investigate the causes behind this change in investors' perception towards bank M&As. Our findings suggest that since 2009, bidder gains are higher for more efficient banks that have less non-performing loans



in their loan portfolios. In addition, banks that expand in problematic euro periphery countries experience even larger abnormal returns.

6.2. Suggestions for future work

This thesis focuses primarily on the market perception towards bank M&As. Throughout our research papers, we managed to identify several instances of shareholder value-creation. However, if these deals are indeed positive net present value investments, then we should observe some sort of merger-related synergies. In this regard, an interest field of future research is to measure any operating or cost efficiencies for those deals that were favored by the market at the announcement date. For example, a fascinating project is to investigate whether the bank M&As during the European sovereign debt crisis improve the efficiency of merging partners, or the observed bidder gains relate to increased market power.

It would be also interesting to investigate whether the reported value gains could be long-lasting. At first, the Trump administration plans to repeal the Dodd-Frank Act. In this case, the observed patterns in abnormal returns are likely to change. In addition, improved corporate governance in the post-crisis period has motivated firm's executives to be more selective in their acquisition practices. Based on this argument, Alexandridis et al. (2017) find that public bids outperform private offers after 2009. In our sample of 2,178 acquisitions by U.S. bank we do not find empirical support for this argument, however, it is a likely scenario as U.S. banks improve their corporate governance. Lastly, it is questionable whether bidding banks in European bank M&As will continue to experience large announcement period gains when the recession is over.



Appendices

Table A3.1

Variable definition

Panel A: Deal Characteristics	
Variables	Definition
State	Dummy variable: 1 if both bidder and target are headquartered in the same state, and 0 otherwise.
Stock	Dummy variable: 1 when the deal is financed purely with stock, and 0 otherwise.
Combo	Dummy variable: 1 when the deal is financed with a combination of cash and stock, and 0 otherwise
Relative Size	The ratio of target to bidder total assets at year-end prior to the merger announcement.
Small	Dummy variable: 1 for mergers with combined firms' assets of less than \$10 billion, and 0 otherwise.
Medium	Dummy variable: 1 for mergers with combined firms' assets between \$10 billion and \$50 billion, and 0 otherwise.
Large	Dummy variable: 1 for mergers with combined firms' assets of more than \$50 billion, and 0 otherwise
Days to Completion	The difference between the announcement and completion date of each merger.
Bid Premium	Offer price per target share divided by the target's market price per share 5 days before the announcement date.
Panel B: Firm Characteristics	
Variables	Definition
Acquirer's Size	The natural logarithm of the bidding firm's total assets at year-end prior to the merger announcement.
Bidder/ Target ROA	Bidder/ target firm's return on assets (ROA) at year-end prior to the merger announcement (Net Income/Total Assets).
Roadiff	The difference between bidder and target return on assets.
Bidder/Target Employees	Bidder/ target firm's number of employees at year-end prior to the merger announcement (in thousands).
Bidder/ Target equity-to-assets	The ratio of the bidder/ target firm's common equity to total assets at year-end prior to the merger announcement.
Frequent Bidders	Dummy variable: 1 for bidders that acquired more than one target during the examination period, and 0 otherwise.

Table A3.2**Difference-in-Differences regression for U.S. bank M&As**

This table summarizes the difference-in-differences regression results for a sample of 640 completed U.S. bank mergers announced between 1990 and 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. In each regression, the dependent variable is the bidder or combined three-day CARs, centered on the announcement date. Examination period starts from 1995 and/or 2000. All independent variables are defined in the Appendix (Table 5.1). All continuous variables are winsorized at 1% and 99% level. The t-statistics reported in parentheses are clustered by bank. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Variables	Bidder CARs		Combined CARs	
	>=1995	>=2000	>=1995	>=2000
Constant	-0.016 (-1.50)	-0.020* (-1.70)	0.010 (0.99)	0.011 (0.95)
DFA	-0.007 (-0.76)	-0.014 (-1.47)	-0.004 (-0.51)	-0.011 (-1.43)
Small	-0.002 (-0.34)	-0.005 (-0.62)	0.003 (0.44)	-0.000 (-0.04)
DFA*Small	0.021* (1.89)	0.025** (2.11)	0.016* (1.71)	0.017* (1.71)
State	-0.004 (-0.43)	-0.006 (-0.54)	0.008 (0.87)	0.007 (0.79)
Stock	-0.000 (-0.09)	0.008 (1.58)	-0.007** (-2.27)	0.001 (0.19)
RelSize	-0.005 (-0.57)	-0.005 (-0.39)	0.026*** (3.59)	0.029** (2.49)
Bidder Size	-0.002 (-0.73)	-0.002 (-0.78)	-0.005** (-2.05)	-0.006** (-2.21)
Days	0.000 (0.59)	0.000 (1.24)	0.000 (0.45)	0.000 (1.08)
N	567	353	567	353
Adjusted R ²	0.000	0.007	0.156	0.180

Table A3.3**Difference-in-Differences regression for European bank M&As**

This table summarizes the difference-in-differences regression results for a sample of completed European bank mergers announced between 1990 and 2014. The dependent variable in each regression is the bidder or combined three-day CARs centered on the announcement day. Examination period dtatrs from 1995 and/or 2000. All independent variables are defined in the Appendix (Table 5.1). All continuous variables are winsorized at 2% and 98% level. The t-statistics reported in parentheses are clustered by bank. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Variables	Bidder CARs		Combined CARs	
	>=1995	>=2000	>=1995	>=2000
Constant	-0.131*	-0.121	-0.039	-0.030
	(-1.83)	(-1.20)	(-0.84)	(-0.52)
DFA	0.010	0.005	0.000	-0.001
	(0.59)	(0.26)	(0.02)	(-0.07)
Small	0.083**	0.125*	0.017	0.035
	(2.08)	(1.82)	(0.93)	(1.15)
DFA*Small	-0.019	-0.061	0.041	0.022
	(-0.38)	(-0.89)	(1.30)	(0.57)
State	0.021*	0.033*	0.008	0.017
	(1.67)	(1.91)	(0.74)	(1.17)
Stock	0.004	0.014	0.001	0.004
	(0.31)	(0.89)	(0.15)	(0.33)
RelSize	0.011	0.001	0.005	0.002
	(0.52)	(0.06)	(0.44)	(0.19)
Bidder Size	0.008	0.007	0.002	0.001
	(1.48)	(0.94)	(0.64)	(0.30)
Days	0.000	-0.000	0.000	-0.000
	(0.87)	(-0.58)	(0.84)	(-0.63)
N	83	52	83	52
Adjusted R ²	0.076	0.176	0.033	0.117

Table A4.1

Variable definition

Panel A: Deal Characteristics	
Variables	Definition
State	Dummy variable: 1 if both bidder and target are headquartered in the same state, and 0 otherwise.
Stock	Dummy variable: 1 when the deal is financed purely with stock, and 0 otherwise.
Combo	Dummy variable: 1 if the deal was financed with a combination of cash and stock, and 0 otherwise.
RelSize	The transaction value divided by the equity market capitalization of the bidding company 5 days prior to the merger announcement
Private	Dummy variable: 1 for acquisitions of privately-held targets, and 0 otherwise.
Subsidiary	Dummy variable: 1 for acquisitions of subsidiary targets, and 0 otherwise.
Pooling	Dummy variable: 1 if the bidder had used the pooling accounting method to incorporate the target into its books, and 0 otherwise.
Panel B: Bidder Characteristics	
Variables	Definition
Bidder Size	The natural logarithm of the bidding firm's total assets at year-end prior to the merger announcement.
Volatility	The standard deviation of the market-adjusted residuals from 210 to 20 days prior to the merger announcement.
ROA	Bidding firms' return on assets (ROA) at year-end prior to the merger announcement
Panel C: Financial Advisor	
Variables	Definition
Advisors	Dummy variable: 1 if the bidding firms had employed at least one financial advisor, and 0 otherwise.
Top-Tier	Dummy variable: 1 for financial advisors that belong to the top-tier group, or 0 otherwise.
Panel D: Regulatory periods	
Variables	Definition
FIRREA	Dummy variable: 1 for deals announced during the FIRREA period (October 1989 to June 1997), and 0 otherwise.
Riegle-Neal	Dummy variable: 1 for deals announced during the Riegle-Neal period (July 1997 to March 2000), and 0 otherwise.
GLBA	Dummy variable: 1 for deals announced during the Gramm-Leach-Bliley period (April 2000 to June 2010), and 0 otherwise.
DFA	Dummy variable: 1 for deals announced during the Dodd-Frank period (July 2010 to December 2015), and 0 otherwise.

Table A5.1

Variable definition

Panel A: Bidder Characteristics	
Variables	Definition
Bidder Size	The natural logarithm of the bidding firm's total assets at year-end prior to the merger announcement.
ROE	Bidding firms' return on equity (ROE) at year-end prior to the merger announcement.
Equity-to-assets	The ratio of the bidding firm's common equity to total assets at year-end prior to the merger announcement.
NPLs	The ratio of the bidding firm's non-performing loans to total loans at year-end prior to the merger announcement.
Efficiency	The ratio of the bidding firm's operating expenses to operating income at year-end prior to the merger announcement.
Liquidity	The ratio of the bidding firm's loans to deposits at year-end prior to the merger announcement.
Panel B: Deal Characteristics	
Variables	Definition
Domestic	Dummy variable: 1 if both bidder and target are headquartered in the same European country, and 0 otherwise.
Product Focus	Dummy variable: 1 if both bidder and target are commercial banks, and 0 otherwise.
Crisis	Dummy variable: 1 when the deal is announced after 2009, and 0 otherwise.
Cash	Dummy variable: 1 when the deal is financed purely with cash, and 0 otherwise.
Stock	Dummy variable: 1 when the deal is financed purely with stock, and 0 otherwise.
Days to Completion	The difference (in calendar days) between the completion date and the announcement date.
Private	Dummy variable: 1 for acquisitions of privately-held targets, and 0 otherwise.
Subsidiary	Dummy variable: 1 for acquisitions of subsidiary targets, and 0 otherwise.
Market Concentration	The ratio of the total assets of the three largest financial firms to the total assets of the whole industry (for the target country).

Table A5.2**Bidder CARs around the announcement date**

This table illustrates the bidder cumulative abnormal returns (CARs) around the merger announcement date for a sample of 522 completed European bank M&As announced between 1990 and 2016. Pre-crisis period is from 1990 to 2008 and crisis period is from 2009 to 2016. Abnormal returns are estimated using the market adjusted returns model over 4 different event windows. The parametric test is the standardized cross-sectional test (StdCsect), and the non-parametric is the Corrado rank test (Rank test). Paired Significance for the difference between mean CARs is based on the *t*-test. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Event Window	Whole period n=522	Pre-Crisis n=396	Post-Crisis n=126	Difference
CAR (0)	0.34%	-0.07%	1.60%	1.67%***
StdCsect	(0.70)	(-1.04)	(3.22)***	(<i>t</i> = 3.77)
Rank Test	(0.23)	(-1.36)	(2.67)***	
CAR (-1,+1)	0.32%	-0.17%	1.88%	2.05%***
StdCsect	(0.95)	(-0.75)	(3.55)***	(<i>t</i> = 3.95)
Rank Test	(0.23)	(-1.73)*	(3.29)***	
CAR (-2,+2)	0.42%	-0.13%	2.17%	2.30%***
StdCsect	(1.03)	(-0.49)	(3.13)***	(<i>t</i> = 3.45)
Rank Test	(-0.87)	(-1.59)	(2.38)**	
CAR (-5,+5)	0.87%	0.60%	1.71%	1.11%
StdCsect	(2.01)**	(0.90)	(2.50)**	(<i>t</i> = 1.21)
Rank Test	(-0.12)	(-0.82)	(1.10)	

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