The Economic Impact of the Dodd Frank Act of 2010:
Evidence from Market Reactions to Events Surrounding the Passage of the Act

(Preliminary, comments welcome!)

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ABSTRACT

We examine stock and bond market reactions to the key events leading to the passage of the Dodd Frank Act to provide empirical evidence on the economic impact of the Act. Using financial institutions less likely to be subjected to the Act as a control group, we find that large financial institutions overall had negative abnormal stock returns and positive abnormal bond returns in response to these events. We also find that these large financial institutions had lower idiosyncratic risk and systemic risk in the period after the Act's passage compared to the period before. These results collectively suggest that the Act has the potential to reduce large banks' risk-taking. On the other hand, we find that the shareholders and bondholders of the Big 6 banks initially experienced strong negative returns, followed by a reversal of these negative returns during the final phase of the passage, supporting the notion that the Act may fall short in solving the too-big-to-fail problem.

THE ECONOMIC IMPACT OF THE DODD FRANK ACT OF 2010: EVIDENCE FROM MARKET REACTIONS TO EVENTS SURROUNDING THE PASSAGE OF THE ACT

1. INTRODUCTION

The passage of the Dodd Frank Wall Street Reform and Consumer Protection Act of 2010 (DFA or Act thereafter) marked a significant milestone in financial regulation. The Act is the legislative response to "the worst financial crisis since the Great Depression" that is commonly attributed to the excessive use of a great variety of structured finance securities and derivative instruments (Skeel 2011 and Wilmarth 2011).[1] The Act attempts to restructure the financial system and restore investors' confidence in the financial market. Among the various objectives of the Act, arguably the two most important goals are to limit the systemic risk of large and systemically important financial institutions, through more explicit regulation on banking and trading activities, and to limit the damage caused by the failure of these institutions through requiring living wills and imposing a new resolution regime (Skeel, 2011).[2]

There has been a furious debate on the merits of the Dodd Frank Act. Supporters have asserted that the new law mandates heightened prudence standards and more transparent disclosure, which should constrain risk-taking and make the financial system safer. In addition, the legal framework of taking over failing financial institutions of systemic importance will prevent future taxpayer bailouts (see, Barr 2011, for an example). However, critics argue that the Act is a manifestation of "government

[1] Examples include asset backed securities (ABS), mortgage backed securities (MBS) and collateralized debt obligations (CDS).

[2] Systemically important financial institutions are defined in the Act as bank holding companies with total consolidated assets of $50 billion or more, and other non-bank financial institutions deemed systemically important by the authorities. The Dodd Frank Act creates a new Financial Stability Oversight Council responsible for identifying systemically important non-bank financial institutions, thus bringing such companies under regulation by the Federal Reserve. The council is chaired by the secretary of Treasury, and includes heads of the major financial regulators – the Federal Reserve, the SEC, the new Consumer Financial Protection Bureau, and an independent representative of the insurance industry.

partnership with the largest financial institutions and *ad hoc* intervention," and fails to make fundamental structural changes that could solve the too-big-to-fail (TBTF thereafter) problem (Skeel 2011 and Wilmarth 2011, among others).

Our objective in this paper is to provide initial empirical evidence on the economic consequences of the Act and whether the Act achieves the goals of reducing large financial institutions' risk-taking and ending the TBTF policy. To answer these questions, we study market reactions to the key events leading to the passage of the Act, and also directly examine whether risk-taking of financial firms decreased in the period after the Act's passage compared to the period before. Our study focuses on systemically important financial institutions because they are explicitly subjected to the Act's main provisions that aim to enhance the financial system. We construct a sample of 41 financial institutions (one-digit SIC code equal to 6) with consolidated assets of $50 billion or more following the size guidelines of systemically important financial institutions in the Act. One empirical challenge to studying the economic consequences of any regulations is to identify a control group of firms unaffected by the regulations (see Leuz 2007 for an example). The Act's main provisions on systemically important financial institutions, allow us to use other financial institutions as a control group to isolate the effects of DFA on systemically important financial institutions from those of other contemporaneous events.

We first study overall stock and bond market reactions to the key events leading to the passage of DFA. We identify the major legislative events by a key word search of "financial regulation" through the *Wall Street Journal* and the *Washington Post* from January 15, 2009, when the Obama administration announced a plan on global financial regulation, to July 21, 2010, when President Obama signed the Act into law. Overall we find that large financial institutions had strong negative abnormal stock returns in response to the key events of DFA, in contrast to strong positive abnormal bond returns in the same event windows. The overall market reactions suggest that shareholders of large financial

institutions bear significant compliance costs of the legislation probably due to the new prudence provisions and restrictions on banking activities. On the other hand, these provisions seem effective in reducing these banks' risk-taking, leading to a positive reaction in the bond market.

We further conduct cross-sectional analyses to explore the underlying mechanisms through which the DFA provisions affect market reactions and reduce risk-taking. Given that DFA proposed heightened prudence standards and various restrictions on large bank holding companies (BHC thereafter) and other firms deemed to be systemically important, we expect stronger reactions for financial institutions that are most likely to be subjected to these prudence standards and restrictions. In support of this prediction, we document that both bank holding companies and non-BHC financial institutions with higher systemic risk experienced more negative abnormal stock returns and more positive abnormal bond returns. Another channel through which the Act might constrain banks' risk-taking is the derivative reform that places the largely unregulated OTC derivative market under regulatory supervision. We find more negative abnormal stock returns for banks with a large derivative position, suggesting that profits from derivative trading shrink and/or risk-taking declines probably as a result of the derivative reform.

Next, we compare the market reactions between the Big 6 banks and the rest of the large financial institutions to assess the likelihood that DFA ends the TBTF policy.[3] The combined assets of the Big 6 banks were worth more than 64% of the national gross domestic product as of the third quarter of 2010, and the collapse of any of the Big 6 banks would cause severe damage to the US economy. If the market believes that DFA ends TBTF by removing public subsidies including the bailout expectation during future emergencies, we would expect more negative market reactions to the largest and most interconnected banks compared to other banks, in particular in the bond market. While there are no

[3] The Big 6 banks are Bank of America, Citigroup, Goldman Sachs, JP Morgan Chase, Morgan Stanley, and Wells Fargo.

significant differences in the overall stock and bond market reactions between the Big 6 banks and other sample firms, we find that the shareholders and bondholders of the Big 6 banks initially experienced strong negative returns, followed by a reversal of these negative returns during the final phase of the passage when the negotiations and compromises were made in Congress.[4] These results suggest that while the markets expect the early versions of the Act to have the potential to solve the TBTF problem, the final version of the bill falls short in this goal due to these compromises.[5]

Finally, we conduct additional analyses on the changes in idiosyncratic risk and systemic risk of these large financial institutions in the post-DFA period compared to the pre-DFA period to directly examine banks' risk-taking activities. Compared to other financial institutions, we find a significant drop in both idiosyncratic risk and systemic risk for the large financial institutions in the 6-month period after the passage of DFA compared to the 6-month period before the first key event of DFA. These initial results provide support for our inferences drawn from the overall stock and bond market reactions that overall risk seems to decline. Further, the cross-section analyses yield similar inferences – we find that bank holding companies, non-BHC financial institutions with higher systemic risk, and financial institutions with more derivative trading experienced a larger decrease in idiosyncratic risk and systemic risk.

This paper makes two primary contributions. First, to the best of our knowledge, our study is the first investigating the market reactions to the Dodd Frank Act of 2010. We add to the debate on DFA by providing empirical evidence suggesting that investors expect DFA to have the potential to constrain large banks' risk-taking, and that the markets view the more strict prudence standards on systemically

[4] These compromises include watering down the restrictions on bank activities and making exceptions to a number of rules details discussed in the following sections.

[5] While the reversal of the negative stock market reactions of the Big 6 banks during the final phase is consistent with shareholders benefiting from fewer restrictions on their operations, the reversal of the negative returns of the Big 6 banks in the bond market less ambiguously suggests that the markets still favor big banks that are most likely protected by the government.

important financial institutions and the derivative reform to be the underlying mechanisms to mitigate risk-taking. We also find evidence consistent with the notion that DFA might not be fully effective in ending the TBTF policy. These results might have regulatory implications for the subsequent rulemaking and implementations of the Act.

Second, we add to the literature on the economic consequences of financial regulation by examining both stock and bond market reactions. Prior studies have largely ignored the bond market reaction to legislative events, probably due to data availability.[6] Debtholders are particularly important for financial institutions versus non-financial firms due to the high leverage in financial institutions. Bond market reactions to the Act can shed light on how bondholders' interests are affected, and more importantly they may help us distinguish between compliance costs and risk-taking hypotheses. The contrasting investor reactions in the two markets are interesting and consistent with the idea that there is a wealth transfer from shareholders to bondholders as a result of the many provisions in the Act that intend to reduce risk-taking.

Our findings and contributions are subject to the following caveats. First, similar to any event studies of major legislations, the implicit assumption in our paper is that stock and bond market prices incorporate the expected costs and benefits of the legislation. Second, the ultimate impact of the Act depends heavily on the subsequent rulemaking and implementations by the regulatory agencies, and there is no doubt that one can only tell whether the Act is effective in solving the TBTF problem until the next financial crisis emerges. Finally, the initial evidence on the risk reductions is based on the data of six months after the passage of DFA, but a more long-term observation may be needed to draw a more conclusive inference. So the results documented in our paper reflect only the market expectations, and are suggestive at best.

[6] The exceptions include Defond, Hung, Karaoglu, and Zhang (2011) who investigate the U.S. bond market reaction to the passage of the Sarbanes-Oxley Act (SOX), and Gao (2011) who studies how SOX affects the choice of bond market by foreign firms.

The rest of the paper is organized as follows. In section 2, we discuss the event history and major provisions of the Dodd Frank Act in detail, and develop hypotheses. We describe the sample and research methodology in section 3. In section 4, we present empirical results. Section 5 concludes the paper.

2. BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1. EVENT HISTORY AND MAJOR PROVISIONS

2.1.1. EVENT HISTORY

The Dodd Frank Act, which combines the financial regulation bills of Sen. Dodd and Rep. Frank, was signed into law by President Obama on July 21, 2010.[7] The Act was the direct results of the severe financial crisis of 2007—2009 and the recession that followed, and was hailed as the most significant overhaul of financial regulation since the New Deal in 1930s. We identify the major legislative events leading to the passage of the Act by a key word search of "financial regulation" through the *Wall Street Journal* and the *Washington Post* from January 15, 2009, when the Obama administration announced a plan on global financial regulation, to July 21, 2010, when President Obama signed the Act into law.

While more stringent financial regulation was widely expected after the financial crisis, the initial signal of the framework of the new financial regulations first emerged in January 2009 when the Obama administration unveiled a plan of more rigorous global financial regulation. Subsequently in the spring of 2009, the Treasury department released "Rules for the Regulatory Road." In June 2009, Treasury Secretary Timothy Geithner and Director of the National Economic council Lawrence Summer provided a preview of the proposal for financial reforms, and President Obama delivered a speech to

[7] Most of the descriptive material in Sections 2.1.1 and 2.1.2 is gathered from various press releases from the *Wall Street Journal* and the *Washington Post*, Skeel (2011), and Acharya, Cooley, Richardson, and Walter (2011).

formally introduce this proposal. Later, Congressman Barney Frank introduced a version of the proposed legislation in the House, and the Frank Bill passed the House in December 2009.

The next big moment came when President Obama formally endorsed the "Volcker Rule" in January 2010. Paul Volcker, former Federal Reserve Chairman, is a main proponent of tougher restraints on banks' activities. He proposed rules to restrict banks from making speculative investments that do not benefit their customers. While the proposal was initially regarded as an undesirable intervention with big banks' business activities, it gradually gained popularity. Another important event occurred on April 13, 2010 when Senator Blanche Lincoln, then Chairman of the Senate Agriculture Committee, proposed the derivative legislation to mandate sweeping changes to the derivative market, including forcing big banks to spin off "swaps desks" that handle the complex financial instruments.

After these events, the details of the legislation remained uncertain. However, the exposure of the securities fraud allegations of Goldman Sachs on April 19, 2010 moved the momentum towards the passage of the legislation.[8] Although the financial regulation was blocked by Republican senators several times, the bill finally reached the Senate floor on April 28 after the congressional hearing on the Goldman executives. On May 20, the Senate passed the Dodd Bill after making compromises to Republican senators to secure their votes. A conference committee was formed to reconcile the House and Senate versions of the bills, and the Conference Committee filed the final conference report on June 29. The final bill was passed in the House on June 30, in the Senate on July 15, and signed into law on July 21.

The final bill is a product of compromises – it is less restrictive than the original "Volcker Rule" and "Lincoln Amendment," and contains a number of amendments. The final phase of the passage, starting from the Senate debate in May to the eventual passage in July, witnessed many negotiations and

[8] The SEC sued Goldman Sachs for defrauding investors by failing to tell them that the mortgage-related investments it had sold them were picked in part by a hedge fund that was betting the default of the mortgages.

compromises that reflected financial industries' overall resistance to the more stringent rules on banking operations. For example, when the conference committee reconciled the House and Senate versions of bills in late June, compromises were made to water down the Volker Rule and the Lincoln Amendment.[9]

2.1.2. MAJOR PROVISIONS

The stated goal of the Dodd Frank Act is "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."[10]

Many of the Act's provisions are targeted at large banks and other financial firms deemed to be systemically important, so we highlight the following main provisions of the Act concerning these companies: first, the Act creates a new Financial Stability Oversight Council responsible for monitoring and managing systemic risk. Systemically important financial institutions include bank holding companies with total consolidated assets greater than $50 billion, as well as nonbank financial firms that the Council deem systemically important. The Federal Reserve will supervise all systemically important financial institutions regardless of their legal chapter. The Council and the Fed will have enhanced power to impose more stringent prudence standards on these firms' capital, leverage, and liquidity.

Second, the Act proposes measures that aim at ending TBTF and future government bail-outs. The Fed and the FDIC will require banks and other major financial firms to prepare living wills that detail how the bank could be closed down in an orderly fashion at bank failure. The Act also provides an orderly resolution mechanism outside of bankruptcy for the FDIC to take over the systemically

[9] A Washington Post article by Brady Dennis (dated June 25, 2010) described how lawmakers spent the day negotiating behind closed doors over issued related to bank trading (the Volcker Rule) and derivatives (the Lincoln Amendment). The compromises include the following examples. In the original Volcker Rule, all kinds of proprietary trading are prohibited, but the modified version adds a 3% threshold. That is banks or financial firms are only prohibited in proprietary trading activities, or investing in hedge funds or private equity funds in excess of 3 percent of their capital. In addition, in the original version of Lincoln Amendment, all derivatives are required to be cleared in clearing houses, but the modified version allows several exceptions which may create loopholes for banks and financial firms.

[10] The Dodd Frank Wall Street Reform and Consumer Protection Act (Enrolled Final Version – HR 4173).

important financial institutions when a financial firm's failure poses threats to the financial stability, thus ruling out bailouts of the failed bank.[11]

Third, the Act places the largely unregulated OTC derivative market under the supervision between the SEC and the CFTC (the Commodities Futures Trading Commissions). Most derivatives will be required to be cleared through central clearing agencies while the more complex ones can remain traded over the counter but will be regulated. Derivative trades must be publicly reported in real time with price and volume information.

Fourth, the Act imposes a number of restrictions on banks, which in spirit reinstates a limited form of Glass-Steagall. For example, the modified Volcker Rule prohibits systemically important banks and other financial firms from engaging in proprietary trading activities, or investing in hedge funds or private equity funds in excess of 3 percent of their capital; and the Lincoln Amendment effectively forces banks to spin off some swap trading operations into separate legal entities. The Act also imposes a size limit on banks, and requires that large financial firms have a Board Risk committee with at least one expert having risk management experience.

The coverage of the Dodd Frank Act extends far beyond these four aspects; however, the other provisions (e.g., consumer protection & compensation and corporate governance provisions) apply to all financial institutions, and do not address the financial stability issue directly. Therefore, we do not discuss these provisions, although they are important in their own rights.

2.2. HYPOTHESIS DEVELOPMENT

We first examine the extent to which the provisions of the Dodd Frank Act reduce risk-taking and impose compliance costs on systemically important financial institutions by investigating market

[11] While this reform intends to stabilize the financial system, some critics argue that it may actually legalize bailouts and significantly impact debt-holders for reordering their priorities in repayments (Skeel, 2011).

reactions to events leading to the passage of DFA. Mehran, Morrison, and Shapiro (2011) note that financial institutions usually have over 90% debt in the capital structure, so debt-holders are the major stakeholders. However, shareholders' interests may diverge from those of debt-holders, especially on risk-taking – shareholders prefer increasing risk and have short-term perspectives, while debt-holders prefer low volatility and take long-term views. If the Act imposes regulatory restrictions on systemically important financial institutions that are effective in constraining risk-taking, we would expect different market reactions around the rulemaking events. That is, while stockholders may react unfavorably to the reduction in risk-taking, debt-holders are more likely to respond positively. Based on these arguments, our first hypothesis is:

H1: The overall stock (bond) market abnormal returns are negative (positive) around the events leading to the passage of the Act.

We further explore the underlying mechanisms through which the DFA provisions affect market reactions and reduce risk-taking. DFA identifies systemically important financial institutions as either bank holding companies with total consolidated assets of $50 billion or more, and other non-bank financial institutions deemed systemically important by the authorities. As mentioned earlier, DFA imposes stringent prudential standards and restricts proprietary trading on systemically important financial institutions, and also requires that derivatives be cleared and traded on exchanges and more transparent disclosure on derivative trades be provided. If the market expects these mechanisms to impose compliance costs and dampen risk taking, we would expect more pronounced market reactions for financial institutions that are more explicitly subjected to the prudence standards and various restrictions and those with higher levels of derivative trading. Based on these arguments, our second hypothesis is thus:

H2: The stock (bond) market abnormal returns around the events leading to the passage of the Act are more negative (positive) for bank holding companies, non-BHC financial institutions with higher systemic risk, and financial firms with more derivative trading.

Next, we investigate the extent to which DFA addresses the TBTF issue. Taxpayer funded bailouts of large financial institutions during the crisis undermined market discipline, generated public outrage, and revealed the fundamental weaknesses in the financial regulatory system. Therefore, there is a strong consensus that one of the primary purposes of the regulatory reform should be to solve the TBTF problem.[12] Although the Act contains provisions to address TBTF, such as requiring living wills and imposing a new resolution regime for systemically important financial firms, commentators voiced concerns that the Act is an inadequate response to the TBTF problem. For example, Wilmarth (2011) argues that the relevant provisions of DFA are unlikely to solve the TBTF problem for a number of reasons. In particular, he points out that the new resolution regime for systemically important financial institutions does not completely preclude future bailouts of favored creditors of those institutions because DFA allows the FDIC to use additional financial assistance sources to protect certain creditors of failed banks through using the "systemic risk exception" provision. In addition, DFA does not require systemically important financial institutions to pay insurance premiums proportionate to their systemic risk to pre-fund the orderly liquidation fund, which is contrary to the standard pre-funding insurance principles that facilitate banks to internalize these costs and thereby to motivate them to take less risk in order to avoid these costs.

We compare the market reactions between the Big 6 banks and the rest of the large financial institutions to assess the extent to which DFA solves the TBTF problem. The combined assets of the Big 6 banks were worth more than 64% of the national gross domestic product as of the third quarter of 2010,

[12] Ben Bernanke, chairman of the Federal Reserve Board, commented on September 2, 2010, "If the crisis has a single lesson, it is that the too-big-to-fail problem must be solved." (Causes of the Recent Financial and Economic Crisis, Statement before the Financial Crisis Inquiry Commission)

and the collapse of any of the Big 6 banks would cause severe damage to the US economy. Credit agencies such as Moody's and S&P publicly acknowledged that they issued ratings on the debt securities of the Big 6 banks several notches above their actual riskiness levels because of "a very high probability of systemic support" from the US government (Wilmarth 2011). Therefore, if investors consider the Act to be effective in solving the TBTF problem by removing public subsidies including the bailout expectation during future emergencies, we would expect more negative market reactions in both equity and bond markets to the Big 6 banks compared to other financial firms. Based on these arguments, our third hypothesis is:

H3: The stock (bond) market abnormal returns around the events leading to the passage of the Act are more negative for the Big 6 banks compared to other financial institutions.

Finally, we directly compare idiosyncratic risk and systemic risk of these financial firms between the periods before and after the passage of DFA to investigate the effectiveness of DFA in reducing risk-taking. We argue that if DFA achieves this purpose, then financial firms would reduce risk taking and the systemic risk of these companies should also decrease. Furthermore, we expect the risk reduction to be stronger for firms that are more likely to be subjected to the Act. Our final hypothesis of the paper is therefore:

H4: Idiosyncratic risk and systemic risk of large financial institutions decline in the period after the passage of the Act compared to the period before, and the decline is more pronounced for bank holding companies, non-BHC financial institutions with higher systemic risk, and financial firms with more derivative trading.

2.3. RELATED RESEARCH

Our paper is related to three strands of literature. First, we add to the large literature on banking regulation by examining the impact of contemporaneous financial regulation that introduces substantive

changes in banks' business activities. The banking industry has undergone a revolution since the late 1970s towards a trend of deregulation that deviates from the fundamental banking regulation structure in 1930s. This movement has arisen through fast-paced market developments and major federal and state regulations.[13] The studies on deregulation legislations generally report positive impact on bank values. For example, Allen and Wilhelm (1988) examine the impact of the 1980 Depository Institutions Deregulation and Monetary Control Act on banks, and find positive market reactions around the passage of the Act. Cornet and Tehranian (1990) document that the passage of the 1982 Garn-St Germain Depository Institutions Act produced positive returns to shareholders of large savings and loans and commercial banks, but not to those of small savings and loans and banks.[14] These studies generally find positive returns for investment banks and insurance companies, but insignificant returns for commercial banks (Carow and Heron 2002; Hendershott, Lee, and Thompkins 2002).

Despite the overall deregulation trend, the momentum shifted at times. The Federal Deposit Insurance Corporation Improvement Act (FDICIA) is one of the legislations in the past decades that imposed more regulation on banks. FDICIA is similar to the Dodd Frank Act to some extent in that FDICIA also aims to enhance financial stability by imposing more stringent capital requirements to reduce risk taking and by early regulatory intervention in troubled or undercapitalized banks. Liang et al (1996) document positive bank stock returns in general but negative returns for undercapitalized banks in response to the passage of FDICIA. Likewise, Akhigbe and Whyte (2001) find a reduction in bank risk taking after FDICIA.

[13] There are seven major Congressional Acts on financial institutions since then: the Depository Institutions Deregulation and Monetary Control Act of 1980, the Garn-St Germain Depository Institutions Act of 1982, the Competitive Equality Banking Act of 1987, the Financial Institutions Reform, Recovery, and Enforcement Act of 1989, the Federal Deposit Insurance Corporation Improvement Act of 1991, the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, and the Gramn-Leach-Bliley Act of 1999.

[14] More examples are as follows. With regard to Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, Brook, Hendershott, and Lee (1994) document significant positive abnormal returns around the passage of the Act, suggesting the benefits of takeover deregulation. There are also several studies on the economic impact of the 1999 Gramn-Leach-Bliley Act (GLBA) on various financial institutions. GLBA repealed part of the Glass-Steagall Act of 1933 and opened up the market among commercial banks, securities firms, and insurance companies.

Second, our study is related to the broad literature on securities regulation starting from early research on the economic consequences of the Securities Acts of 1933 and 1934 to recent studies on the Sarbanes Oxley Act of 2002. However, there is mixed evidence on the economic consequences of these securities regulations. Stigler (1964) and Benston (1973) find no evidence of changes in returns or the variability of returns after the Securities Act of 1933 and Securities Exchange Act of 1934, and interpret the evidence as mandatory disclosures being costly to investors. Recently, Zhang (2007) documents significant negative abnormal returns around key SOX events for US firms using stock returns of non-US traded foreign firms as a control. In contrast, two studies by Rezaee and Jain (2006) and Li, Pincus, and Rego (2008) find that the cumulative event returns to SOX are significantly positive.

Finally, our study is associated with the ongoing research interests in understanding the causes and consequences of the recent financial crisis. Excessive risk-taking by financial institutions is commonly identified as the main causes of the financial crisis (see, Rajan 2010 and Wilmarth 2011, for example). DFA is the regulatory responses to the financial crisis, and we add to this line of literature by providing direct evidence regarding the markets' evaluation of the effectiveness of DFA.

3. SAMPLE AND RESEARCH METHODOLOGY

3.1. SAMPLE AND DATA

Our sample of systemically important financial institutions is comprised of financial institutions (SIC codes between 6000 and 6999) with total assets of $50 billion or more at the end of year 2008. We choose the $50 billion cutoff following the size guidelines of systemically important financial institutions specified in the Act. We exclude Freddic Mac and Fannie Mae from our sample as they are government sponsored institutions. To isolate the time and industry effects, and confounding effects of other contemporaneous events, we use the rest of the financial firms as our control sample. Our focus on

systemically important financial institutions allows us to use other financial institutions as a control group: given that the Act's main provisions of interests to our study only apply to these systemically important financial institutions, we believe that other financial institutions serve as a valid control group. Further, to mitigate the effects of firm-specific confounding news, we exclude a firm from the event analysis when its earnings announcement and other major firm-specific news overlapped with the event window.

Stock returns data are from CRSP, and bond returns data are from TRACE (Trade Reporting and Compliance Engine). Relevant financial variables are collected from Compustat, and bond characteristics such as rating, time to maturity, and coupon payments are from FISD (Fixed Income Security Database). We also collect systemic risk proxies for the largest financial institutions as of December 31, 2008 from NYU Stern's Vlab.[15] After imposing data requirement, our final sample consists of 41 financial institutions in the stock market analysis and 31 financial institutions in the bond market analysis.

3.2. VARIABLE MEASUREMENT

ABNORMAL STOCK RETURNS. We estimate abnormal stock returns for large financial institutions around the 17 events identified in Table 1.[16] We exclude July 21, 2010 from our events because once DFA was passed in Congress, presidential approval was well expected. Following the general event-study literature (e.g. Campbell, Lo, and MacKinlay 1997; Armstrong, Barth, Jagolinzer, and Riedl 2010),

[15] Website – http://vlab.stern.nyu.edu/welcome/risk.

[16] In general, we estimate three-day abnormal returns around each of the event dates. We make the following adjustments for event windows: (1) for speech related events, if the news about the main content of the speech appeared before the actual speech, the event window covers the day of the news report and the day of the speech; if the news about the main content of the speech appeared after the actual speech, the event window covers the day of the speech and the day after the speech (i.e., the day of the news report); (2) if multiple events happened within a week, we combined them into a long window.

we adjust raw event returns by subtracting the event returns of the control group to mitigate confounding effects.

ABNORMAL BOND RETURNS. Compared to the estimation of abnormal stock returns, the estimation of abnormal bond returns poses difficulties because (1) firms might have multiple bond issues with each having its own return series, maturity, and rating; (2) there is also a lack of liquidity in the bond market. Bessembinder, Kahle, Maxwell, and Xu (2010) examine the empirical power and specification of test statistics that measure abnormal bond returns in corporate event studies, and conclude that the use of daily bond data increases the power of the tests, and that the matched index approach is more appropriate. Therefore, we follow Bessembinder et al (2010) by employing the matched index approach to compute abnormal bond returns from daily bond data.

We begin by estimating abnormal return for each bond, calculated as the buy-and-hold daily return minus the value weighted daily return of the rating-and-maturity matched portfolio over the same event window.[17] Instead of using the "Leman Index Portfolio" constructed from non-financial firms as the matched portfolio, we form 6 portfolios of bonds issued by financial institutions for each event. We classify all bonds issued by financial firms into 3 rating groups: Aaa to A3; Baa1 to Baa3; Ba1 and below. Within each rating group, we further partition them into 2 subgroups based on the time to maturity: equal to or less than 5 years, and longer than 5 years. Finally, we aggregate abnormal bond returns for each bank: if a bank has multiple bonds over the same event window, we take equal weighted average as the bank-level abnormal return.[18]

[17] The buy-and-hold daily return is calculated as $\frac{P_e - P_s + AI}{P_s * D}$, where P_e is the last trade price in the last trading day within the event window, P_s is the last trade price in the last trading day between 30 days and 1 day prior to the beginning of the event window, AI is the accrued interest, and D is the number of holding days. The buy-and-hold return is converted into daily return since the length of holding period varies.

[18] As a robustness check, we also calculate firm-specific abnormal bond return using value weighted average and using the largest market value bond as the representative bond for each bank. We find qualitatively similar results in both overall bond market reactions and in cross-sectional regressions as those presented in the paper when we use these two alternative proxies.

IDIOSYNCRATIC RISK AND SYSTEMIC RISK. We also directly examine the changes in idiosyncratic risk and systemic risk. Specifically, we measure the changes in idiosyncratic risk and systemic risk from the 6-month period before the first key event of DFA (July 14, 2008 to January 13, 2009) to the 6-month period after the passage of DFA (July 17, 2010 to December 31, 2010). We compute idiosyncratic risk as the standard deviation of the sample bank's daily stock returns. We measure systemic risk as the average loss of the bank on the 5% worst days in market performance defined using CRSP equal weighted market returns over the two periods (MES). We choose MES as the proxy for systemic risk because Acharya, Pedersen, Philippon, and Richardson (2010) suggest that MES is a better indicator for systemic risk and has the highest correlations with other potential systemic risk proxies.

OTHER VARIABLES. Variables of interest in cross-sectional analyses include proxies for the level of systemic risk and the level of derivative trading before the first event of DFA. Specifically, we use quintile ranks of systemic risk (*SYS*) on December 31, 2008 from NYU Stern's Vlab, and use quintile ranks of derivative trading (*DER*) measured as the absolute value of accumulative derivative unrealized gains or losses (Compustat "aaocidergl") divided by total assets (Compustat "at") as of the end of 2008. We also include an indicator variable for bank holding companies (*BHC*) as these companies are explicitly mentioned in DFA to be subjected to the supervision of the Council. We additionally control for *CAP*, the quintile ranks of capital ratio (measured as common shareholders' equity divided by total assets as of the end of 2008) in the regression model. Appendix A lists the definition of variables alphabetically.

4. EMPIRICAL RESULTS

4.1. THE OVERALL MARKET REACTION

We first examine the overall abnormal stock (bond) returns for the 41 (31) financial institutions in our sample around the key events of DFA. Following Armstrong et al (2010), we construct portfolio event returns by averaging each bank's abnormal returns to obtain a portfolio for each event. We employ this portfolio approach to construct test statistics because the portfolio returns for each event are less likely subject to potential cross-sectional correlations (Sefcik and Thompson 1986), and portfolio returns associated with different events are uncorrelated (Fama and MacBeth 1973). We present two statistics to test the statistical significance of the portfolio event returns. We first test whether the average of the 17 event portfolio returns differs from zero,[19] and then analyze whether the average returns of the 17 event portfolio differ from the mean of the non-event portfolio returns.[20]

Table 1 reports the portfolio event return statistics. For each of the 17 events, we present the raw stock (bond) returns to the portfolio of 41 (31) financial institutions, the mean stock returns of other financial institutions (the rating-maturity matched bond index returns of financial institutions), and the abnormal stock (bond) returns.[21] The bottom of Table 1 presents the mean of the 17 event returns. For the stock market, we find that the mean raw stock return associated with the 17 events for the large financial institution portfolio is -0.019, compared to -0.004 for the mean stock return of other financial institutions. The mean abnormal stock return is -0.015, and it is significantly different from zero (t-statistic equal to -2.34), and significantly different from the non-event returns (t-statistic equal to -2.03). On the other hand, we observe a contrasting pattern in the bond market. We find that the average daily bond return associated with the 17 events for the large financial institution portfolio is 0.0012, compared

[19] The standard deviation used to compute the statistic is from the distribution of the 17 event portfolio returns.

[20] The advantage of this test statistic is that it does not assume that the adjustment using other financial institutions fully accounts for the expected return. To form the distribution of non-event returns, we calculate non-overlapping 3-day (daily) abnormal returns in the stock (bond) market, and construct portfolio returns for the sample firms for all days between January 1, 2009 and July 31, 2010 that do not overlap with our event windows.

[21] Abnormal stock returns are calculated as the difference between the raw stock returns and the mean stock returns of other financial institutions, and abnormal bond returns are computed as the difference between the raw bond returns and the rating-maturity matched bond index returns of financial institutions.

to 0.0007 for the average of rating-maturity matched bond index daily returns. The mean abnormal bond return is 0.0005 (5 basis points), and it is significantly different from zero (t-statistic equal to 2.48), and significantly different from the non-event returns (t-statistic equal to 3.07).[22] The overall market reaction evidence provides strong support for H1, suggesting that investors in both markets expect large financial institutions to reduce future risk-taking.[23]

4.2. CROSS SECTIONAL ANALYSES OF CUMULATIVE ABNORMAL RETURNS

4.2.1. THE STOCK MARKET

Next, we turn to the cross-sectional regression analyses of cumulative abnormal returns. Specifically, we estimate the following regression:

$$CMAR\ (or\ CPAR) = \beta_0 + \beta_1 BIG6 + \beta_2 SYS + \beta_3 BHC + \beta_4 SYS * BHC + \beta_5 CAP + \beta_6 DER$$

where *CMAR* (*CPAR*) is the cumulative abnormal stock (bond) returns across the 17 events.[24] The definitions of the explanatory variables are in Section 3.2. We include an interaction term of *SYS* and *BHC* to allow the market reactions on systemic risk to differ between bank holding companies and non-BHC financial institutions.

We start with the stock market. Table 2 presents the Pearson correlation of stock market *CMAR* and the explanatory variables in the regression model. The results suggest that the cumulative abnormal returns in the stock market are negatively correlated with *SYS* and *DER*, consistent with our prediction in

[22] The abnormal bond return is 0.0004 using value weighted average (t=2.00 for the mean of abnormal returns and t=1.62 for the comparision to the non-event abnormal returns), and 0.0008 using the largest market value bond as the representative bond for each bank (t=2.23 for the mean of abnormal returns and t=2.61 for the comparision to the non-event abnormal returns). Note that while the magnitude of bond market returns is not directly comparable to that of the stock market returns, the magnitude of the abnormal bond returns documented in our paper is comparable to those in prior studies (see Bessembinder et al 2010). In addition, the bond market returns are measured at the daily level, but the stock returns are measured at the event-window level.

[23] We also note that our inferences concerning investors' overall reaction to the DFA events are not sensitive to whether the raw portfolio returns are adjusted, because the signs of the mean of the raw returns in both markets are consistent with those of the abnormal returns (the mean of the raw stock returns is negative, and the mean of the raw bond returns is positive).

[24] We also conduct regression analyses in the stock and bond markets using a dependent variable of abnormal return for each firm-event, and we find qualitatively similar results as those reported in Table 3 and Table 5.

H2 that financial institutions that are systemically more important and have higher derivative trading will have more negative abnormal stock returns. However, we do not find a statistically significant correlation between *CMAR* and *BIG6*. We also notice a statistically positive correlation between *CMAR* and *CAP*, suggesting that the stock market considers well-capitalized financial institutions to have lower compliance costs.

Model (1) of Table 3 shows the OLS regression results from the basic regression model. The coefficients on *BHC* and *SYS* are negative and statistically significant, and the coefficient on the interaction term of *SYS* and *BHC* is positive and significant. These results together are consistent with H2, suggesting that bank holding companies and non-BHC financial institutions with higher systemic risk experience more negative abnormal stock returns as they are subjected to the more strict prudence standards and restrictions on proprietary trading under DFA. We also find a negative and significant coefficient on *DER*, implying that financial institutions with higher levels of derivate trading potentially face more compliance costs and have a higher inclination to reduce risk taking. .

The negative coefficient on *BIG6*, however, is only marginally significant (at the 10% level, one-tailed test). In order to have a better understanding of the stock market reactions of the Big 6 banks, we partition the sample events into two periods, the early period and the later period starting from the Senate debate in May to the final passage in July. The rationale for this partition is that there were many negotiations and compromises in Congress during the final phase of the legislation, which might shift the market's belief about the effectiveness of DFA to solve the TBTF problem. For example, Wilmarth (2011) notes that DFA relies on an *ex post* funding system to finance the orderly liquidation of failing financial institutions; however, in the earlier stage, both the bill passed by the House and the bill presented by the Senate Committee on Banking, Housing, and Urban Affairs required the establishment of a *pre-funded* orderly liquidation fund. This change to the *ex post* funding system in the final bill is a

result of winning votes from Republican lawmakers. Acharya et al. (2011) argue that such an *ex post* funding system does not provide incentives for large institutions to internalize the systemic risk, so it cannot solve the TBTF problem. They further argue that this system may even cause other institutions to mimic large institutions' behaviors, thereby increasing systemic risk.

Therefore, we additionally include an indicator variable *LaterEvent* and an interaction term of *LaterEvent* and *BIG6* in the regression model to explore whether the compromises made in the final stage of the legislation have changed the markets' expectation towards the TBTF issue. The results are reported in model (2). The negative coefficient on *BIG6* now becomes statistically significant, and we additionally find a positive and highly significant coefficient on the interaction term of *LaterEvent* and *BIG6*. These results are consistent with the notion that the stock market expects the early versions of the bill, rather than the final bill, to have the potential to solve the TBTF problem. The political compromises and negotiations taking place in the final stage of the legislation might have undermined the effectiveness of the Act to end the TBTF policy.[25]

4.2.2. THE BOND MARKET

We now turn to the bond market. Table 4 presents the Pearson correlation of bond market *CPAR* and the explanatory variables in the regression model.[26] We find a positive and significant correlation between the cumulative abnormal bond returns and *SYS*. This result is opposite to the negative correlation in the stock market, but consistent with the notion that the bond market expects the prudence standards and restrictions on proprietary trading for systemically important financial institutions to reduce risk.[27] We also document a statistically significant negative correlation between *CPAR* and *CAP*

[25]One alternative explanation of this result is that it may reflect the benefits from fewer restrictions on big banks' operations as a result of the watering down of many rules in the final stage of the Act. However, we argue that the bond market reactions help distinguish between these two interpretations.

[26] We present the correlation in the bond market separately because we have a smaller sample in the bond market analyses.

[27] The Pearson correlation between CMAR and CPAR is -0.274, consistent with the conjecture that DFA affects the stock and bond market differently. However, the negative correlation is only marginally significant probably due to the small sample size.

in the bond market. However, we do not find statistically significant correlations between bond market *CPAR* and other explanatory variables.

Model (1) of Table 5 displays the OLS regression results from the basic regression model. The coefficients on *SYS* and *BHC* are positive and statistically significant, and the coefficient on the interaction term of *SYS* and *BHC* is negative and significant. These results are in opposite directions from those in the stock market (Table 3), but are consistent with H2 predicting that both markets expect bank holding companies and non-BHC financial institutions with higher systemic risk to take less risk in future operations. However, we do not observe a significant coefficient on *DER* in the bond market.

We find a negative and insignificant coefficient on *BIG6*. Similar to the approach in the stock market, we include an indicator variable *LaterEvent* and an interaction term of *LaterEvent* and *BIG6* in the regression model. The results in model (2) of Table 5 show that the negative coefficient on *BIG6* becomes statistically significant, and the interaction term of *LaterEvent* and *BIG6* is positive and significant. These findings in the bond market are remarkably similar to those in the stock market, suggesting that the bond market also expects the initial versions of the Act to have the potential to end TBTF, but becomes skeptical about the discretion and effectiveness of DFA to solve the TBTF problem during the final phase of the passage.

4.3. CHANGES IN IDIOSYNCRATIC RISK AND SYSTEMIC RISK

Our empirical results above suggest a general pattern of gains to bondholders and losses to shareholders in response to the key events surrounding the passage of DFA. To corroborate the inferences drawn from the overall market reactions, we conduct analyses on the changes in idiosyncratic risk and systemic risk of these large financial institutions. We first examine whether the level of idiosyncratic risk and systemic risk decreased in the 6-month period after the passage of DFA compared

to the 6-month period before the first key event of DFA again using other financial institutions as a control for our difference-in-difference analysis. We then conduct cross-sectional analyses by estimating the following regression model:

$$CHRISK = \beta_0 + \beta_1 BIG6 + \beta_2 SYS + \beta_3 BHC + \beta_4 SYS * BHC + \beta_5 CAP + \beta_6 DER$$

where *CHRISK* is the difference in idiosyncratic (systemic) risk between the pre-DFA period and the post-DFA period. The definitions of the explanatory variables are in Section 3.2.

Table 6 presents the analysis of idiosyncratic risk. Panel A compares the level of idiosyncratic risk before and after DFA using other financial institutions as a control. The results show that there is an overall reduction in the level of idiosyncratic risk in the period after the passage of DFA. This is probably not very surprising because the period before the first event of DFA was characterized by high volatility as a result of the severe financial crisis. We also find a positive coefficient on the indicator variable for systemically important financial institutions (our sample banks), consistent with the observation that large banks in general are more risky. More importantly, we find a negative and significant coefficient on the interaction term, which is consistent with H4. On the other hand, the cross-sectional regression results in Panel B indicate that financial institutions with higher systemic risk and with more derivative trading experienced a larger drop in idiosyncratic risk, largely consistent with the cross-sectional results from the overall market reactions.

Finally, Table 7 presents the analysis of systemic risk. Panel A compares the level of systemic risk before and after DFA. The results are similar to those of Table 6 Panel A in both the signs of coefficients and levels of statistical significance, and again show a reduction in the level of systemic risk for large financial institutions relative to other financial institutions in the post-DFA period compared to the pre-DFA period. Likewise, the overall cross-sectional regression results in Panel B are consistent with our early findings from cross-sectional analyses of the stock and bond market reactions and from

the analysis of changes in idiosyncratic risk. These findings suggest that bank holding companies, non-BHC financial institutions with higher systemic risk, and financial institutions with more derivative trading experienced a larger drop in systemic risk.

5. CONCLUSION

In this paper, we examine stockholder and bondholder reactions to the key events leading to the passage of DFA to provide empirical evidence on the economic impact of the Act. Using other financial institutions as a control, we document overall strong negative abnormal stock returns and strong positive abnormal bond returns for large financial institutions, as well as a significant drop in idiosyncratic risk and systemic risk of these companies after the passage of the Act. Our cross-sectional results indicate that the markets view the more strict prudence standards and proprietary trading restrictions on systemically important financial institutions and the derivative reform to be the underlying mechanisms to reduce risk-taking. On the other hand, we find that the shareholders and bondholders of the Big 6 banks initially experienced strong negative returns, followed by a reversal of these negative returns during the final phase of the passage when the negotiations and compromises were made in Congress.

Taken together, our results suggest that the Act has the potential to reduce large banks' risk-taking, but may fall short in solving the TBTF problem. These findings in our paper reflect the investment community's collective expectation about the intended and unintended consequences of the Act, and may be of interests to both academic scholars and regulators.

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Table 1
Large Financial Institutions' Overall Market Reactions to Events Surrounding the Passage of DFA

	Event Periods	Description	Stock Market			Bond Market		
			Raw Return	Other Financial Institutions' Return	Abnormal Return	Raw Return	Rating-Maturity Matched Index Return	Abnormal Return
1	Jan 14, 2009-Jan 16, 2009	The Obama administration announced a plan on global financial regulation.	-0.106	-0.023	-0.082	-0.0015	-0.0025	0.0011
2	Mar 24, 2009-Mar 26, 2009	Geithner presented the framework of financial regulation & the Treasury department released "Rules for the Regulatory Road".	-0.013	0.020	-0.031	0.0050	0.0001	0.0049
3	Jun 9, 2009-Jun 10, 2009	The Obama administration pulled back from the idea of consolidating power under fewer federal agencies.	-0.012	-0.003	-0.009	0.0038	0.0029	0.0009
4	Jun 15, 2009-Jun 17, 2009	Geithner and Summers previewed the financial reform proposal & President Obama delivered a speech on financial regulation.	-0.081	-0.029	-0.052	0.0000	0.0004	-0.0004
5	Sep 14, 2009-Sep 15, 2009	President Obama delivered a speech on financial regulation to the Wall Street.	0.024	0.013	0.011	0.0017	0.0014	0.0003
6	Nov 9, 2009-Nov 11, 2009	Senator Dodd introduced the Senate regulatory reform bill that would strip the Fed of all the power to oversee banks.	0.040	0.011	0.029	0.0001	0.0005	-0.0004
7	Dec 1, 2009-Dec 3, 2009	Congressman Frank introduced a version of the proposed legislation in the House.	-0.020	0.005	-0.026	0.0006	-0.0002	0.0008
8	Dec 10, 2009-Dec 11, 2009 & Dec 14, 2009	The House passed the Frank Bill.	0.016	0.010	0.005	0.0010	0.0007	0.0002

9	Jan 20, 2010-Jan 21, 2010	President Obama endorsed the "Volcker Rule".	-0.014	-0.005	-0.009	0.0010	0.0017	-0.0007
10	Mar 15, 2010-Mar 16, 2010	Senator Dodd introduced a revised financial regulation bill that included compromises.	0.015	0.005	0.010	0.0020	0.0008	0.0012
11	Mar 22, 2010-Mar 23, 2010	The Senate banking committee passed the financial regulation bill.	0.010	0.009	0.001	0.0004	0.0003	0.0001
12	Apr 13, 2010-Apr 15, 2010	Lincoln proposed the derivative legislation to mandate sweeping changes to the derivative market.	0.009	0.016	-0.007	0.0017	0.0021	-0.0004
13	Apr 16, 2010 & Apr 19, 2010	The SEC filed securities fraud charges against Goldman Sachs.	-0.019	-0.010	-0.009	0.0015	0.0007	0.0008
14	Apr 26, 2010-Apr 29, 2010	The financial regulation bill was blocked by GOP senators, but reached the Senate floor after the hearing of Goldman executives.	-0.024	0.003	-0.026	0.0002	0.0005	-0.0003
15	May 17, 2010-May 21, 2010	The Senate passed the Dodd Bill.	-0.055	-0.051	-0.004	-0.0008	-0.0005	-0.0003
16	Jun 24, 2010-Jun 25, 2010 & Jun 28, 2010-Jun 30, 2010	Conference committee finished reconciling the House and Senate versions of the bills & the final bill was passed in the House.	-0.061	-0.029	-0.032	0.0007	0.0007	0.0000
17	Jul 12, 2010-Jul 16, 2010	The final bill was passed in the Senate.	-0.034	-0.012	-0.022	0.0022	0.0015	0.0007
Mean return across events					-0.015	0.0005		
t-stats					-2.34**	2.48***		
t-stats of compared to non-event non-overlapping 3-day (daily) abnormal returns between Jan 1, 2009 and July 31, 2010 in the stock (bond) market					-2.03**	3.07***		

Note: (1) ***and ** represent 1% and 5% significance levels, respectively. Large financial institutions are those with SIC codes between 6000 and 6999 and with total assets of $50 billion or more, measured at the end of 2008. Freddie Mac and Fannie Mae are excluded from the sample. Other financial institutions' stock returns are calculated as the average of stock returns of financial institutions with total assets less than $50 billion. In calculating portfolio return of each event, financial institutions that have earnings announcement dates overlapping with the event window are excluded. Bank of America is excluded for event 8, and Goldman Sachs is excluded for event 13 in calculating the portfolio returns.

(2) Portfolio-adjusted abnormal bond return is calculated as the buy-and-hold daily return minus the value weighted daily return of the rating-and-maturity matched portfolio over the same event window. The buy-and-hold daily return is calculated as $\frac{P_e - P_s + AI}{P_s * D}$, where P_e is the last trade price in the last trading day within the event window, P_s is the last trade price in the last trading day between 30 days and 1 day prior to the beginning of the event window, AI is the accrued interest, and D is the number of holding days. The buy-and-hold return is converted into daily return because the length of holding period varies. For each event, 6 portfolios are constructed: we first classify all bonds issued by financial firms into 3 rating groups: Aaa to A3; Baa1 to Baa3; Ba1 and below. Within each rating group, we further classify the bonds into 2 subgroups based on the time to maturity: equal to or less than 5 years; and longer than 5 years. These cutoffs are designed to ensure roughly balanced number of bonds in each portfolio. If a firm has multiple bonds, we take the average of the bond abnormal returns.

Table 2
Pearson Correlations (and p-values) in the Stock Market

	CMAR	BIG6	SYS	BHC	CAP
BIG6	-0.188 (0.228)				
SYS	-0.382 (0.012)	0.587 (0.001)			
BHC	-0.218 (0.161)	0.342 (0.025)	0.292 (0.058)		
CAP	0.395 (0.009)	-0.340 (0.026)	-0.569 (0.001)	0.000 (1.000)	
DER	-0.292 (0.064)	-0.050 (0.759)	-0.009 (0.581)	0.286 (0.069)	0.039 (0.808)

Note: Appendix A lists the definition of variables alphabetically.

Table 3
Cross-Sectional Analysis on Cumulative Abnormal Stock Returns

		Model (1)	Model (2)
	Predictions	Coefficients (t-stats)	Coefficients (t-stats)
Intercept	?	-0.028 (-0.27)	-0.042 (-0.82)
BIG6	–	-0.161 (-1.35)*	-0.232 (-3.56)***
LaterEvent	?		0.051 (1.91)*
BIG6*LaterEvent	?		0.306 (4.41)***
SYS	–	-0.101 (-2.89)***	-0.048 (-2.92)***
BHC	–	-0.241 (-2.29)**	-0.109 (-2.16)**
SYS*BHC	+	0.138 (2.75)***	0.066 (2.77)***
CAP	?	0.015 (0.60)	0.008 (0.69)
DER	–	-0.042 (-2.09)**	-0.024 (-2.51)***
N		41 firms	82 firm-periods
R-Squared		0.2812	0.3940

Note: ***, **, and * represent 1%, 5% and 10% significance levels, respectively (two-tailed or one-tailed as appropriate). The dependent variable is CMAR. In Model (1), CMAR is accumulated over the 17 events for each firm. In Model (2), CMAR is calculated in 2 separate periods: from event 1 to and event 13, and from event 14 to event 17. See Table 1 for event description. Appendix A lists the definition of variables alphabetically.

Table 4
Pearson Correlations (and p-values) in the Bond Market

	CPAR	BIG6	SYS	BHC	CAP
BIG6	-0.024 (0.600)				
SYS	0.076 (0.096)	0.660 (<0.0001)			
BHC	-0.027 (0.553)	0.407 (<0.0001)	0.193 (<0.0001)		
CAP	-0.082 (0.073)	-0.338 (<0.0001)	-0.550 (<0.0001)	0.044 (0.337)	
DER	-0.002 (0.964)	0.022 (0.634)	0.111 (0.016)	0.350 (<0.0001)	-0.133 (0.004)

Note: Appendix A lists the definition of variables alphabetically.

Table 5
Cross-Sectional Analysis on Cumulative Abnormal Bond Returns

		Model (1)	Model (2)
	Predictions	Coefficients (t-stats)	Coefficients (t-stats)
Intercept	?	-0.005 (-0.58)	0.002 (0.42)
BIG6	–	-0.013 (-1.13)	-0.011 (-1.82) **
LaterEvent	?		-0.009 (-2.51) ***
BIG6*LaterEvent	?		0.009 (1.89) **
SYS	+	0.013 (3.18) ***	0.006 (1.99) **
BHC	+	0.017 (2.17) **	0.008 (1.32)*
SYS*BHC	–	-0.010 (-1.91) **	-0.005 (-1.30)*
CAP	?	-0.002 (-0.92)	-0.001 (-0.84)
DER	+	-0.002 (-1.12)	-0.001 (-0.96)
N		31 firms	62 firm-periods
R-Squared		0.5262	0.2720

Note: ***, **, and * represent 1%, 5% and 10% significance levels, respectively (two-tailed or one-tailed as appropriate). The dependent variable is CPAR. In Model (1), CPAR is over the 17 events for each firm. In Model (2), CPAR is calculated in 2 separate periods: from event 1 to and event 13, and from event 14 to event 17. See Table 1 for event description. Appendix A lists the definition of variables alphabetically.

Table 6
Analysis of Idiosyncratic Risk Before vs. After the Passage of DFA

Panel A: Compare Sample Large Financial Institutions and Other Financial Institutions

Variable	Prediction	Coefficients	T-stats
Intercept	+	0.055	85.96***
POST	–	-0.034	-43.87***
SAMPLE	+	0.025	7.43***
SAMPLE*POST	–	-0.027	-5.68***
N		3,115	
R-Squared		0.4044	

Note: *** represents 1% significance level. The dependent variable is IRISK. Appendix A lists the definition of variables alphabetically.

Panel B: Cross-Sectional Analysis on Changes in Idiosyncratic Risk

		Model (1)	Model (2)
Variable	Prediction	Coefficients (t-stats)	Coefficients (t-stats)
Intercept	?	-0.029 (-2.68)***	-0.047 (-3.17)***
BIG6	?	-0.020 (-1.22)	-0.016 (-1.06)
SYS	–	-0.015 (-2.99)***	-0.007 (-1.52)*
BHC	–	-0.029 (-1.72)**	-0.008 (-0.51)
SYS*BHC	+	0.022 (2.88)***	0.015 (2.25)**
CAP	?		0.008 (2.38)**
DER	–		-0.009 (-3.25)***
N		41	41
R-Squared		0.1703	0.4144

Note: ***, ** and * represent 1%, 5% and 10% significance levels, respectively (two-tailed or one-tailed as appropriate). The dependent variable is CHIRISK. Appendix A lists the definition of variables alphabetically.

Table 7
Analysis of Systemic Risk Before vs. After the Passage of DFA

Panel A: Compare Sample Large Financial Institutions and Other Financial Institutions

Variable	Prediction	Coefficients	T-stats
Intercept	+	0.067	86.33***
POST	–	-0.050	-45.24***
SAMPLE	+	0.643	13.48***
SAMPLE*POST	–	-0.057	-8.47***
N		3,115	
R-Squared		0.4347	

Note: *** represents 1% significance level. The dependent variable is MES. Appendix A lists the definition of variables alphabetically.

Panel B: Cross-Sectional Analysis on Changes in Systemic Risk

		Model (1)	Model (2)
Variable	Prediction	Coefficients (t-stats)	Coefficients (t-stats)
Intercept	?	-0.081 (-7.63)***	-0.088 (-5.65)***
BIG6	?	-0.045 (-2.32)**	-0.040 (-2.33)**
SYS	–	-0.017 (-3.38)***	-0.013 (-2.33)***
BHC	–	-0.056 (-3.32)***	-0.037 (-2.23)**
SYS*BHC	+	0.033 (4.05)***	0.028 (3.69)***
CAP	?		0.007 (1.82)**
DER	–		-0.010 (-3.34)***
N			41
R-Squared		0.2587	0.4541

Note: ***, ** and * represent 1%, 5% and 10% significance levels, respectively (two-tailed or one-tailed as appropriate). The dependent variable is CHMES. Appendix A lists the definition of variables alphabetically.

Appendix A
Variable Definition

Variable	Definition
BHC	An indicator variable that equals to 1 for bank holding companies, and 0 otherwise.
BIG6	An indicator variable that equals to 1 for Bank of America, Citigroup, Goldman Sachs, JP Morgan Chase, Morgan Stanley, and Wells Fargo, and 0 otherwise.
CAP	Quintile ranks of capital ratio measured as common shareholders' equity (COMPUSTAT "ceq") divided by total assets (COMPUSTAT "at") at the end of 2008.
CHIRISK	Changes in idiosyncratic risk from the period of July 14, 2008 to January 13, 2009 to the period of July 17, 2010 to December 31, 2010, where the idiosyncratic risk is measured as the standard deviation of abnormal stock returns. Abnormal stock returns are calculated as the difference between large financial institution's daily returns and the average returns of other financial firm's daily returns.
CHMES	Changes in MES from the period of July 14, 2008 to January13, 2009 to the period of July 17, 2010 to December 31, 2010.
CMAR	Cumulative abnormal stock returns across the 17 events, where abnormal returns are computed as raw returns over each event window minus the average returns of other financial institutions over the same window.
CPAR	Cumulative abnormal portfolio-adjusted bond return across the 17 events, where abnormal portfolio-adjusted bond return is calculated as the buy-and-hold daily return minus the value weighted daily return of the rating-and-maturity matched portfolio over the same event window. The buy-and-hold daily return is calculated as $\frac{P_e - P_s + AI}{P_s * D}$, where P_e is the last trade price in the last trading day within the event window, P_s is the last trade price in the last trading day between 30 days and 1 day prior to the beginning of the event window, AI is the accrued interest, and D is the number of holding days. The buy-and-hold return is converted into daily return because the length of holding period varies. For each event, 6 portfolios are constructed: we first classify all bonds issued by financial firms into 3 rating groups: Aaa to A3; Baa1 to Baa3; Ba1 and below. Within each rating group, we further classify the bonds into 2 subgroups based on the time to maturity: equal to or less than 5 years; and longer than 5 years. These cutoffs are designed to ensure roughly balanced number of bonds in each portfolio. If a firm has multiple bonds, we take the average of the bond abnormal returns.
DER	Quintile ranks of the level of derivatives, measured as the absolute value of accumulative derivative unrealized gain or loss (COMPUSTAT "aocidergl") divided by total assets (COMPUSTAT "at") at the end of 2008.
IRISK	Standard deviation of daily returns over the period from July 14, 2008 to January 13, 2009 or over the period from July 17, 2010 to December 31, 2010.
LaterEvent	An indicator variable that equals to 1 for the cumulative abnormal returns from event 14 to event 17, and 0 otherwise.
MES	Average loss on the 5% worst days in market performance, where performance is measured using CRSP equally weighted market returns (ewretd) over the period from July 14, 2008 to January 13, 2009 or the period from July 17, 2010 to December 31, 2010.
POST	An indicator variable that equals to 1 for the period from July 17, 2010 to December 31, 2010, and 0 for the period from July 14, 2008 to January 13, 2009.
SAMPLE	An indicator variable that equals to 1 for large financial institutions with assets of $50

	billion or more measured at the end of 2008, and 0 for other financial institutions.
SIZE	Quintile ranks of total assets (COMPUSTAT "at") measured at the end of 2008.
SYS	Quintile ranks of systemic risk as of December 31, 2008 collected from http://vlab.stern.nyu.edu/analysis/RISK.USFIN-MR.MES.