Is the Fox Guarding the Henhouse?
Bankers in the Federal Reserve, Bank Leverage and Risk-shifting

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Abstract

Nearly 30% of US banks employ at least one board member who currently serves (or has previously served) the Federal Reserve in a public service role. Public service roles take the form of Federal Reserve directorships or memberships in Federal Reserve advisory councils. We show that connections between banks and the Federal Reserve are linked to decreases in the sensitivity of bank leverage to risk. Further, connected banks extract larger public subsidies by shifting risk to the financial safety-net. Jointly, our results suggest that interactions between banks and regulators reduce supervisory effectiveness.

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1. Introduction

The governance of the US banking system is different from many other nations and firms in other regulated industries. Members of the banking industry have direct oversight of one of their regulators, their local Federal Reserve Banks. While there may be communication benefits to the Fed from such arrangements, they raise the question of whether private benefits accrue to banks at the expense of taxpayers—i.e., whether bankers connected to the Fed are foxes guarding the henhouse.

Perhaps surprisingly, there is very little research on this topic. Adams (2017) documents positive market reactions to announcements when bankers obtain Federal Reserve Bank board directorships. However, the reason for this is not clear. The effects could be due to the preferential treatment of connected banks that allows these banks to shift risk to the taxpayer. In this paper, we address this explanation. Using a framework that measures bank risk-taking and risk-shifting to the financial safety-net (see Merton, 1977; Duan et al., 1992; Hovakimian and Kane, 2000; Carbo-Valverde et al., 2008; 2012; 2013), we demonstrate that allowing bankers to serve in the Fed is associated with lower supervisory effectiveness that is costly to taxpayers.

The two main responsibilities of the Federal Reserve System (the Fed) are the conduct of monetary policy and the supervision of commercial banks (Board of Governors of the Federal Reserve System, 2018). For more than a century, the Fed has granted banks a privileged role in its governance. Bankers employed by banks that are under its purview sit on the boards of regional Federal Reserve Banks and serve on various advisory councils.[1] While Fed directors are *not* involved in matters relating to the supervision of individual banks, their responsibilities include supervising the Reserve Bank's operations, monitoring Reserve Bank Presidents and providing input on monetary policy. In addition, the Fed also relies heavily on advisory councils, consisting of bankers, to inform policy and forecasts of economic growth.

Representation of bankers in the Fed could facilitate regulatory capture. Stigler (1971) argues that regulators are frequently captured by the industries they regulate. Because regulators are subject to agency and behaviorial conflicts (e.g., career concerns, social relationships, identification and approval from industry), representation in the Fed may facilitate socially adverse outcomes by catering to the private interests of industry (Laffont and Tirole, 1993; Dal Bo, 2006). For instance, serving in the Fed allows bankers opportunities to establish social relationships with supervisors. This could undermine monitoring by making the relationship between supervisors and supervisees more communal (Mills and Clark, 1982).

The regulatory-capture view predicts that banks with directors who hold positions at the Fed (we refer to these as 'connected banks') will receive preferential treatment in supervision. Though regulatory capital requirements are rule-based, regulators have some discretion in evaluating the riskiness of bank assets and, by extension, the amount of capital that banks are required to hold against them (Vallascas and Hagendorff, 2013; Mariathasan and Merrouche,

[1] The 12 regional Federal Reserve Banks (Reserve Banks) are privately owned and partly governed by member banks in their district. The Federal Reserve Act of 1913 mandates that three out of the nine directors on a Reserve Bank's board of directors (Fed directors) are specifically appointed to represent member banks (Board of Governors of the Federal Reserve System, 2013).

2014). We test for regulatory capture by examining whether connected banks are able to increase risk-taking, and shift risk to the safety-net, at the expense of taxpayers.

We start by identifying directors from US public Bank Holding Companies (BHCs) from years 2001-2013 who served in a public service capacity at the Fed from their CVs.[2] From there, we construct bank-level measures that indicate if the bank gains or loses board members that currently or previously served: (1) as directors on the board of a regional Reserve Bank or; (2) in advisory councils at the Fed in a public service capacity.[3] Nearly 30% of banks in our sample employ at least one board member who either presently is or has previously been connected to the Fed in a public service capacity.

In the presence of deposit insurance, the cost of risk-taking to shareholders of the bank is subsidized, incentivizing banks to increase risk at the expense of taxpayers (Merton, 1977; Allen and Gale, 2000; Anginer et al., 2014). To test if public service connections lead to lower supervisory effectiveness in safeguarding taxpayer interest, we follow a commonly used framework to measure risk-taking and shifting to the financial safety-net (Hovakimian and Kane, 2000; Carbo-Valverde et al., 2008; 2012; 2013; Bushman and Williams, 2012; Acharya et al., 2016).

In this framework, the value of public subsidies afforded to shareholders of banks can be modelled as the value of a put option that is underwritten by the FDIC. To prevent banks from shifting risk to the safety-net, regulators must monitor and discipline bank risk-taking.

[2] Throughout the paper, we use the term banks to refer to BHCs unless we need to distinguish between a BHC and banks operating under the BHC.

[3] We include previous as well as current connections because many of the effects of connections that our analysis is meant to identify outlast currently active connections. In robustness tests, we show that our results are robust to using only *current* public service connections.

They do so by requiring a commensurate decrease in leverage when bank risk increases (Duan et al., 1992).[4] If the capital discipline imposed by regulators is insufficient to offset increases in risk, banks can increase the value of public subsidies by increasing risk.[5, 6]

Our baseline results indicate that connections to the Fed increase the gains to banks from shifting risk to the financial safety-net. On average, additions to public service connections increase the value of the implicit put option underwritten by the FDIC by 17%. This gain is achieved through an increase in risk-taking. The results hold after we include bank, regulator-year and state-year fixed effects. That is, we are able to identify the effects of connections within the *same* bank, while controlling for *time-varying* regulatory and state economic variables.

We perform a variety of tests to establish the robustness of our results. First, we design a difference-in-difference (DiD) analysis around the planned retirements of regional Reserve Bank Presidents. The timing of planned retirements, when Presidents have reached retirement age, are guided by regulatory term limits that are largely outside the control of Presidents or the banks they supervise. We use these retirements as negative shocks to the quality of existing bank connections to the outgoing President and compare the effect on banks *within* the districts from which Presidents retire. Second, our baseline results continue to hold even after the

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[4] The intuition is that increases in the value of the put to banks comes at the expense of the FDIC. As the value of the put option is dependent on risk and leverage, increases in risk must be met with decreases in leverage for the value of the put to remain constant. We discuss the model in detail in Section 2.2.

[5] While Reserve Banks do not explicitly target risk-shifting by banks, they enforce risk-based capital requirements which are designed to ensure that banks are able to absorb losses that are line with their asset risk. Therefore, more risk-shifting by banks implies higher potential losses to taxpayers and, thus, a loss of supervisory effectiveness.

[6] The two principal advantages of this approach over market or book measures of bank risk are that it: (i) links shareholder benefits directly to the risk of bank assets, and; (ii) offers a mechanism for how risk-shifting takes place (through a decrease in sensitivity of leverage to risk). Further, this approach includes market data that adjust quickly to reflect market expectations of changes in the risk of bank assets brought on by connectedness.

inclusion of a large number of additional controls, alleviating concerns that public service in the Fed correlates with omitted variables (e.g., other bank connections, market discipline, and additional CEO, board-level and county-level characteristics). Though our analyses do not allow us to conclusively draw a causal link, our evidence at a minimum provides insights into an important phenomenon, namely that serving in the Fed is associated with large increases in bank risk-taking and shifting.

We next investigate if risk-taking and shifting incentives increases for Fed connected banks in the post-crisis period. During the 2008 financial crisis, the Emergency Economic Stabilization Act (EESA) was signed into law to stabilize financial markets. Consistent with the view that regulatory intervention increased moral hazard and bank risk-taking (Duchin and Soysura, 2014; Lambert et al., 2017) and signaled the willingness of regulators to engage in forbearance (Archarya and Yorulmazer, 2007; Brown and Dinç, 2011), we find that increases in connections to the Fed is associated with larger gains in risk-taking and shifting in the post-crisis period, and for banks which receive bailout funds.

The final section offers further results that support our risk-shifting narrative. We show that increases in Fed connectedness are associated with riskier bank policies, as shown from larger growth in lending, bad loans, risk-weighted assets, non-interest income and the volatility of earnings. However, the resulting riskier policies are not absorbed by shareholders and debtholders. There is no detectable change in stock-market measures of bank risk. Also, depositors (both insured and uninsured) do not require higher interest rates. This implies that, as banks engage in riskier activities, the risk-shifting we document ensures that taxpayers, and not bank shareholders or depositors, absorb the higher risk exposures of connected banks.

This paper contributes to the political economy literature that provides evidence of how the financial industry captures politicians and regulators. Kroszner and Strahan (1999) show that interest groups are a strong determinant of the timing of banking deregulation in the US. Igan et al. (2012) find that lobbying banks originated more risky mortgages in the pre-crisis period and were more likely to be recipients of bailout funds. Lambert (2018) show that lobbying banks are less likely to receive regulatory enforcement actions, while Duchin and Sosyura (2012), Li (2013), and Berger and Roman (2015) show that politically connected banks were more likely to be bailed out during the 2008 financial crisis.[7] Acemoglu et al. (2016) find that banks with personal connections to Timothy Geithner experienced positive abnormal returns on his announcement of nominee for the US Treasury Secretary in 2008. On the other hand, Lucca et al. (2014) and Shive and Forster (2017) find evidence supporting the idea that financial institutions hire ex-regulators for their skills, rather than for purposes of capture.

Our study adds to this area of research by documenting that having bankers serve in the Fed is associated with a decrease in supervisory effectiveness. In doing so, we identify a previously underexplored channel through which regulatory capture manifests itself. This channel is more insidious than others, such as lobbying, because it results from time-honored features of the way the Fed operates, features that presumably are intended to improve rather than undermine regulatory oversight.

Our paper is also related to the extensive literature on moral hazard brought upon by government guarantees in the financial industry (see Calomiris and Jaremski (2016) for a

[7] Similarly, Bayazitova and Shivdasani (2012) show that politically connected banks remained longer under the "TARP" bailout program. This indicates that connected banks judge the negative consequences of government influence in a bailout program as lower compared with banks that lack strong political connections.

review). Related to deposit insurance, Wheelock and Wilson (1995), Demirguc-Kunt and Detragiache (2002), and Lambert et al. (2017) find that more generous schemes increase bank risk-taking and the likelihood of bank failures. Other studies test for explicit risk-shifting to the financial safety-net in the presence of deposit insurance. Carbo-Valverde et al. (2012) document that banks conduct cross-border mergers as a means of extracting safety-net benefits from countries with lower supervisory effectiveness. Similarly, Carbo-Valverde et al. (2013) and Acharya et al. (2016) find that too-big-to-fail banks are more able to extract subsidies from the safety-net. Duchin and Sosyura (2012; 2014) show that bailed-out US banks underperformed and took on more risk during the 2008 crisis.[8]

Our study contributes to this area of research by documenting that regulatory arrangements, whereby bankers serve in directorship and advisory roles at the Fed, exacerbate the moral hazard problem arising from deposit insurance. We also add to the literature on the effects of EESA by showing that risk-taking and shifting increased at connected banks after EESA, and in particular, for banks that were bailed out.

Finally, our work is related to the literature on the determinants of bank risk-taking. Extant studies have found that amongst other factors, bank board composition (e.g., Berger et al., 2014; Minton et al., 2014; Vallascas et al., 2017; Anginer et al., 2018), CEO characteristics (e.g., Ho et al., 2016; King et al., 2016), CEO compensation incentives (e.g., Hagendorff and Vallascas, 2011; Fahlenbrach and Stulz, 2011) and culture (Fahlenbrach et al., 2012; Adhikari

[8] Using German data, Dam and Koetter (2012) find that increases in bailout expectations increases the probability of bank failures. Gropp et al. (2014) show that the removal of government guarantees led to safer savings banks.

and Agarwal, 2016) are related to bank risk-taking. We complement this by documenting that the experience and connections of bankers matter; serving the Fed leads to riskier bank policies.

2. Institutional Setting and Hypothesis Development

2.1 Institutional Setting

The Federal Reserve System (The Fed), located in Washington D.C., is headed by the Board of Governors (The Board) which oversees the activities of the 12 regional Federal Reserve Banks (Reserve Banks). The 12 Reserve Banks operate in geographically segregated "districts" (or "regions") and form the operating arms of The Board.[9]

Amongst other duties such as the maintenance of payment services, the 12 regional Reserve Banks are tasked with the supervision of banks in their district. Additionally, 9 out of 12 of the Reserve Banks have branches under them (24 branches in total).[10] Each regional Reserve Bank is headed by a President. The 12 Reserve Banks and their 24 branches are *each* overseen by a board of directors (Reserve Bank directors). When carrying out their responsibilities, the Board of Governors and the 12 Reserve Banks (and their branches) rely extensively on a range of advisory councils.

Our study focuses on the members of a bank's board who presently serve or have previously served the Federal Reserve System in a public service capacity. Public service roles

[9] The 12 regional Fed Banks are: Boston (1), New York (2), Philadelphia (3), Cleveland (4), Richmond (5), Atlanta (6), Chicago (7), St Louis (8), Minneapolis (9), Kansas City (10), Dallas (11) and San Francisco (12). As of 2018, the Federal Reserve Banks of Boston, New York and Philadelphia do not have branches under them. The New York Fed oversaw a Buffalo Branch but it was closed in 2008.

[10] Refer to https://www.federalreserve.gov/aboutthefed/structure-federal-reserve-system.htm for more information pertaining to the general structure and duties of the Fed System.

at the Fed are different from full-time employment with regulators (e.g., bank supervisors or administrative staff at the Fed). Public service roles are positions undertaken by private sector individuals (including bankers) as a form of service to the public. The two main types of public service roles that bankers undertake at the Fed include: (1) a directorship with one of the regional Reserve Bank boards (or its branches) or; (2) membership in an advisory council (to advise the Board of Governors or the Reserve Banks).

As regards Reserve Bank directorships, the 12 Federal Reserve Banks are each overseen by a 9-person board that is equally divided into three classes of directors (A, B and C). Class C directors are appointed by the Board of Governors to represent the public. Class A and B directors are elected by member banks in each of their 12 districts to represent the banks and the public, respectively. Class A directors are typically bank officers and directors of the commercial banks residing in the district in which the Reserve Bank operates.[11] Branches of the Reserve Banks follow a similar structure as the regional Reserve Banks but have smaller boards (5 or 7-person boards).[12] Reserve Bank directors generally serve staggered 3-year terms with a maximum of 2 terms.

Directors of the Reserve Bank's board are responsible for supervising the Reserve Bank's operations, internal governance and its internal auditing procedures. They also hold senior Reserve Bank executives such as the President to account and provide input on monetary policy. Crucially, Reserve Bank directors are not involved in matters of supervision. That is,

[11] Class B and C directors cannot be employees of the bank while serving Reserve Bank directorship positions. They are however not prohibited from joining banks after their tenure as Reserve Bank directors. Class B and C directors typically consist of senior executives of non-financial firms.

[12] For 5-person boards, 3 directors are Class A or B, and the rest, Class C. 7-person boards consist of 2 Class A and B directors each and 3 Class C directors.

“[Fed] directors may not be consulted regarding bank examination ratings, potential enforcement actions, application/approval matters and other such supervisory matters” (Board of Governors of the Federal Reserve System, 2013, pg. 41). Thus, Reserve Bank directors are not in a position to favor a particular bank directly, nor to acquire detailed knowledge pertaining to bank supervision.

The second type of public service position we include in our analysis is membership in an advisory council to a Reserve Bank or to the Board of Governors. The range of advisory councils that bankers may serve in is extensive (see Panel D of Table 1). Because the raison d'être of advisory councils is the gathering of information from stakeholders for the implementation of monetary policy and regulation, banks tend to be well represented on advisory councils.[13]

Advisory councils typically meet 2 to 4 times a year with their respective Reserve Bank Presidents (or the Board of Governors), consist of 10 to 12 members, have 2- to 3-year terms (with the possibility of extension) and varied responsibilities. For instance, the Federal Advisory Council (FAC) which advises the Board of Governors describes itself as "…composed of twelve representatives of the banking industry, consults with and advises the Board on all matters within the Board’s jurisdiction […]. [Each] year, each Reserve Bank chooses one person to represent its District on the FAC, and members customarily serve three one-year terms” (Board of Governors of the Federal Reserve System, 2016).

[13] For instance, The Federal Reserve Bank of New Yorks states that it “meets regularly with small business leaders, community bankers, financial market participants, economists and others through external committees and outreach programs to obtain essential perspectives on the economy from both Main Street and Wall Street. These interactions help the New York Fed to provide timely information to the Federal Reserve System and to support the formulation and implementation of monetary policy effectively” (Federal Reserve Bank of New York, 2015).

2.2 Modelling Bank Subsidies

Our main approach uses the deposit insurance premium model pioneered by Merton (1977) and later developed by Duan et al. (1992) and Hovakimian and Kane (2000) to estimate the subsidies afforded to banks. Merton (1977) models safety-net subsidies as the value of a put option underwritten by the FDIC (and by extension, the taxpayer). On a conceptual level, deposit insurance permits banks to put the assets back to the FDIC at the face value of its debt whenever the value of assets falls below the value of liabilities. Therefore, bank shareholders can extract higher public subsidies by increasing the value of the put option if they increase asset risk and leverage.[14]

This model is widely used to test for risk-shifting by banks to the financial safety-net (e.g., Duan et al. 1992; Hovakimian and Kane, 2000; Wagster, 2007; Bushman and Williams, 2012; Carbo-Valverde et al., 2008; 2012; 2013; Acharya et al, 2016). Risk-shifting is distinct from risk-taking in that the former arises when a contractual counterparty (in this case, the taxpayer) is inadequately compensated for the risks to which they are exposed. The model permits us to investigate if having directors that served in the Fed influences supervisory effectiveness and allow banks to extract larger benefits from the financial safety-net by increasing risk.

This paper adopts the quasi-reduced form equations developed by Duan et al. (1992) and Hovakimian and Kane (2000):

$$(B/V) = \alpha_0 + \alpha_1\sigma_V + \varepsilon_1 \qquad (1)$$

[14] The idea corresponds to the valuation of a put option. The value of a put option increases in volatility (bank asset risk) and leverage (the strike price).

$$IPP = \beta_0 + \beta_1 \sigma_V + \varepsilon_2 \tag{2}$$

where *B* is the book value of debt, *V* the market value of bank assets, *B/V* the leverage ratio, σ_V the volatility of the bank's assets and *IPP* the per-period flow of subsidies to bank shareholders, defined as the actuarially fair insurance premium percentage per dollar of debt. The estimation of *V*, σ_V and *IPP* is described in Appendix B.

The slope coefficients of Equations (1) and (2) have the following interpretations:

$$\alpha_1 = d(B/V) \,/\, d\sigma_V \tag{3}$$

$$\beta_1 = dIPP \,/\, d\sigma_V = (\partial IPP \,/\, \partial\sigma_V) + \partial IPP \,/\, \partial(B/V)\alpha_1 \tag{4}$$

Equation (1) describes the notion that regulators restrict banks to certain combinations of leverage and volatility. Accordingly, Equation (1) reflects regulatory discipline as reducing (increasing) bank leverage as an institution's asset risk increases (decreases). Equation (2) measures if banks are able to increase the value of public subsidies by increasing risk after overcoming the effects of discipline imposed by regulators.

For regulatory forces to fully neutralize risk-shifting incentives, two joint conditions have to be satisfied:

Leverage decreases with asset volatility: $\alpha_1 < 0$

The value of public subsidies (IPP) does not rise with asset volatility: $\beta_1 \leqslant 0$.

A negative α_1, while indicative of disciplinary forces imposed on a bank, is insufficient to show that regulatory discipline mitigates the incentives to shift risk. To fully neutralize risk-shifting incentives, the decline in leverage must be sufficiently large to offset increases in the value of public subsidies that would be generated by increasing asset volatility ($\beta_1 \leqslant 0$). If so, banks would not find it advantageous to increase risk.

2.3 Hypothesis and Empirical Model

We hypothesize that allowing bankers to serve in the Fed leads to regulatory capture. As put forth by Stigler (1971), the framework theorizes that regulators are often beholden to the industry and firms under their supervision. Information asymmetry surrounding supervision grants discretionary powers to regulators, who might not necessarily work to promote societal welfare, but instead, seek to further their own private interests (Baron and Myerson, 1982; Laffont and Tirole, 1993; Dal Bo, 2006). The institutional setting of the Fed in allowing bankers opportunities to establish connections with regulators can exacerbate capture.

The private interests that regulators pursue could either be economic or in terms of utility (or both). With regard to economic interest, the prospect of future employment in the banking sector could incentivize a regulator to be less stringent in their supervision in an attempt to promote relationships with the industry, or the firm that they are supervising (e.g., Cornaggia et al., 2016; Horton et al., 2017). With regard to utility, regulators could seek to protect their social connections with bankers that they personally know by avoiding "rocking the boat" (Barth et al., 2012). Regardless of the reason, allowing bankers opportunities to take up positions at the Fed alters the dynamics between supervisor and supervisee—the relationship becomes more communal (Mills and Clark, 1982), undermining supervisory effectiveness.

Several features of the banking industry further exacerbate regulatory capture. Information asymmetry between supervisors and banks is likely to be relatively severe, given the complexity and opacity of a bank's portfolio (Dang et al., 2017). In addition, even though regulatory capital requirements are rule-based, supervisors have broad discretion in evaluating the riskiness of bank assets and the amount of capital that banks should hold against them (Vallascas and Hagendorff, 2013; Mariathasan and Merrouche, 2014). Importantly, there is evidence that banks consciously exploit the combination of information gaps and regulatory discretion; banks choose to strategically underreport their riskiness to regulators when they have incentives to do so—when they have lower capitalization levels (Begley et al., 2017; Plosser and Santos, 2018).

The regulatory-capture view therefore predicts that banks who have directors that are currently serving (or used to) serve in the Fed would receive preferential treatment in supervision. Subsequently, we expect that risk-taking increases and risk discipline decreases at connected banks, leading to increased risk-shifting and access to larger public subsidies. This could arise due to less stringent ongoing regulatory supervision (Adams, 2017; Lambert, 2018) or decreases in market discipline that arise because of updated expectations of supervisory laxity or explicit bailouts in adverse conditions (Duchin and Sosyura, 2012; Li, 2013; Berger and Roman, 2015). We do not require distinction between the two channels—our framework hypothesizes that regulatory capture leads to preferential treatment of banks.

To empirically analyze if regulatory connections are linked to risk, and subsequently, larger public subsidies, we modify Equations (1) and (2) as:

$$(B/V)_{i,t} = \alpha_0 + \alpha_1 \sigma_{Vi,t} + \alpha_2 Fed\ Gain\ (Loss)_{i,t}\ x\ \sigma_{Vi,t} + \alpha_3 Fed\ Gain\ (Loss)_{i,t} + Bank\ Controls_{i,t} + Fixed\ Effects + \varepsilon_{i,t} \quad (5)$$

$$IPP_{i,t} = \beta_0 + \beta_1 \sigma_{Vi,t} + \beta_2 Fed\ Gain\ (Loss)_{i,t}\ x\ \sigma_{Vi,t\ t} + \beta_3\ \alpha_3 Fed\ Gain\ (Loss)_{i,t} + Bank\ Controls_{i,t} + Fixed\ Effects + \varepsilon_{i,t} \quad (6)$$

where *i* indexes bank and *t* indexes calendar year. *Fed Gain (Loss)* is our main measure of regulatory connections and is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the bank board who have public service experience at the Fed (defined in greater detail in Section 3.2), and 0 otherwise.

The coefficient α_2 captures the effect of gains and losses of connectedness to the Fed on regulatory discipline imposed on banks in response to changes in risk (sensitivity of changes in leverage to changes in risk).

Hypothesis 1: Gaining (losing) Fed public service connections leads to lower (higher) levels of leverage-risk sensitivity ($\alpha_2 > 0$).

If $\alpha_2 > 0$ and a bank's risk increases, the leverage of banks that gain (lose) connections does not decrease (increase) by as much as the leverage of banks that do not change their connectedness to the Fed.

The coefficient β_2 measures the effect of which gains and losses of connectedness to the Fed has on a bank's ability to access public subsidies.

Hypothesis 2: Gaining (losing) Fed public service connections leads to higher public subsidies when bank risk increases ($\beta_2 > 0$).

If $\beta_2 > 0$ and a bank's risk increases, gains (losses) in Fed connections mean higher (lower) gains to risk-shifting.

3. Data and Descriptive Statistics

3.1 Sample Construction

Our initial sample consists of all public US banks from 2001 to 2013 covered in BoardEx. BoardEx provides detailed biographical and employment (current and historical) data on all members of the board which allows us to identify public service positions held at the Fed. BoardEx's data on corporate directors starts in 2001 and is drawn from various sources, including SEC filings, company press releases, corporate websites and news outlets. We retain deposit-taking banks with SIC codes starting 602 (commercial banks) and 603 (savings institutions).

< INSERT TABLE 1 HERE >

We match our list of BoardEx banks to 4th Quarter FR Y9-C consolidated accounting information reported by banks to the Federal Reserve. Market information is obtained from CRSP. The final sample of banks contains 2,539 bank-year observations consisting of 411 unique banks spanning years 2002-2013.[15] Appendix A provides definitions of the variables used in this study. Summary statistics are reported in Panel A of Table 1.

3.2 Bank Regulatory Connections

We identify members of a bank's board that are currently serving or have previously served the Fed in a public service capacity; that is, have experience serving as a director in the Fed or as an advisor on advisory councils. We include previous as well as current public service positions,

[15] While data from BoardEx begins in 2001, our analysis is conducted from years 2002 onwards due to first-differencing.

because the potential benefits of a connection (e.g., personal familiarity with regulators) will arguably outlast the period during which the connection is active.

Our main variable of interest, *Fed Gain* (*Loss*) is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of a bank board who have public service experience in the Fed, and 0 otherwise. This includes Reserve Bank directorship positions at the 12 regional Federal Reserve Banks (and their 24 branches) as well as memberships in various advisory councils at all levels of the Fed (Reserve Banks as well as the Board of Governors). Information on each director's employment history is from BoardEx. We manually supplement missing information from Federal Reserve annual reports, legal documents, LinkedIn, Marquis Who's Who, and, news sources such as Bloomberg, the Wall Street Journal, and the Financial Times. Panel D of Table 1 lists the public service roles that bank directors have undertaken or are currently serving in at the Fed.

In robustness tests, we employ three alternate definitions of connectedness to the Fed and find broadly similar results. First, we use *Current Fed Gain* (*Loss*), which is = 1 if there is an increase (decrease) in the number of bank directors who are presently undertaking (ending) public service positions at the Fed. We also use *Fed Directorship Gain* (*Loss*) and *Fed Advisory Gain* (*Loss*) which are = 1 if there is an increase (decrease) in the number of directors of the bank who have experience as a Reserve Bank director, or an advisor in the various advisory councils, respectively.

Panels B and C of Table 1 show descriptive statistics for banks with public service connections. From Panel B, 27% of bank-years in our sample have at least 1 director with public service connections to the Fed. 23% (11%) of bank-years have at least 1 director with Reserve Bank directorship (advisory council) experience. Additionally, directors who undertake public service roles at the Fed are not limited to a small subset of banks; 129 out of 448 (29%) banks in our sample have at least 1 director connected this way. In Panel C, we show the breakdown by year of the gains and losses of connections to the Fed as well as the number of banks with at least 1 director with public service experience. As observed, public service connections between banks and regulators are widespread.

3.3 Control Variables

Our control variables corresponds broadly to the CAMELS ratings system. CAMELS—an acronym for capital adequacy, asset quality, management quality, earnings, liquidity and sensitivity to market risk—is a composite supervisory rating system used by bank supervisors to assess the safety and soundness of a bank.[16] Because we control for risk-shifting incentives, we interact all control variables with σ_V. Bank safety and soundness are likely to affect the gains from risk-shifting because banks in poor financial condition may have more to gain (Eisdorfer, 2008; Bushman and Williams, 2012). Alternatively, these banks may receive more regulatory attention and thus be less able to shift risk. As CAMELS ratings are confidential, we employ proxies for each component.

We measure capital adequacy using *Tier-1 Capital* and proxy for asset quality using *Bad Loans*. We also include as controls several board-level corporate governance variables for the quality of management. We proxy for the effectiveness of monitoring and advisory functions of the board using *Board Size* and *Board Independence* (e.g. Adams and Mehran, 2012; Minton et al., 2014; Vallascas et al., 2017; Anginer et al., 2018), and for the power of the

[16] See https://www.fdic.gov/regulations/examinations/

CEO in affecting risk policies using *CEO Tenure* and *CEO Duality* (e.g., Ellul and Yerramilli, 2013).

Earnings and liquidity are proxied by *ROA* and *Total Deposits*, respectively. We proxy for *Market Risk* using the gap between short-term assets and short term-liabilities scaled by total assets. The gap approximates the net amount of assets and liabilities that are required to be repriced within one year, reflecting the bank's sensitivity to interest rate risk. Further, we control for firm size using the log of *Total Assets* and its value squared. Carbo-Valverde et al. (2013) show that too-big-to-fail banks are able to access larger public subsidies.

4. Baseline Results

4.1 Changes in Connections and Risk-Taking: Sensitivity of Bank Leverage to Risk

Table 2 shows how gains and losses of public service connections to the Federal Reserve affect risk-taking by banks, measured using its leverage-risk sensitivity (Hypothesis 1). If increases in connectedness are useful for banks, we expect decreases in leverage to be less sensitive to risk increases when the number of connected directors rises. By the same token, we expect decreases in leverage to be more sensitive to risk increases when the number of connected directors falls.

Our results confirm these expectations. The coefficient on our main interaction term of interest, *Fed Gain x* σ_v, is positive and statistically significant at at least the 5% level in Columns (1) to (6). This shows that, when banks gain connections to the Fed, banks reduce their leverage less for a given increase in asset risk, compared to banks that have not increased their connections. In Columns (7) to (12), we show that reductions in Fed connections, as indicated by a negative sign on the interaction term *Fed Loss x* σ_v, lead to increases in the sensitivity of leverage to risk, as compared to banks that have not lost any connections.

These results hold under a range of different specifications and fixed effects that examine variation in the sensitivity of leverage to risk both *across* banks and *within* individual banks. In Columns (1) and (7), we include only bank, regulator and year fixed effects to show that our results are not driven by our choice of control variables. While all BHCs in our sample are supervised by the Fed, some banks operating under the umbrella of a BHC are supervised by a different federal agency (the FDIC or the OCC). Regulator fixed effects therefore controls for the regulator of the largest commercial bank operating under the BHC.

< INSERT TABLE 2 HERE >

In Columns (2) to (3) and (8) to (9), we include our vector of control variables and use a combination of regulator and year fixed effects, with and without bank fixed effects. For brevity, we only show the interaction term between control variables and σ_v and omit the level terms.[17] Our results are therefore robust to time-invariant omitted bank and regulator variables (e.g., a bank's risk culture or regulatory style) that could explain the risk sensitivity of bank leverage (e.g., Fahlenbrach et al., 2012)

Columns (4) and (10) control for a bank's headquarters state-year and regulator-year fixed effects. The inclusion of regulator-year fixed effects allows us to to control for any time-varying changes in the intensity of supervision (Agarwal et al., 2014). Further, state-year fixed effects controls for state-level changes in regulations, laws or economic conditions that could

[17] In unreported robustness tests, we find similar results when we do not interact control variables with σ_v.

affect bank business policies. Column (5) and (11) adds bank fixed effects to this specification to demonstrate that these results hold in a within-bank specification as well as an across-bank specification (Columns (4) and (10)).

Finally, Columns (6) and (12) control for year-, regulator-, and size ventile-year fixed effects. In this set-up, we examine variation in the risk sensitivity of bank leverage *within* 20 size groups (by assets). The size ventile-year fixed effects are particularly important in ruling out concerns that banks of different size might have different propensities to establish connections or shift risk. For instance, larger (too-big-to-fail) banks may show a higher propensity for acquiring public service roles (Adams, 2017) and for risk-taking (Carbo-Valverde, 2013). The inclusion of this fixed effects means that our results hold *within* individual size groups.[18]

The results are economically meaningful. For instance, in Column (5) and (11), a gain (loss) in Fed connectedness decreases (increases) the sensitivity of leverage to risk by 6.1% (8.3%).[19] The economic magnitude is comparable to that found in other studies involving regulatory capture. Duchin and Sosyura (2014) find that politically connected banks that received bailout funds in the crisis increased the riskiness of their mortgage loans by 5.4%. Similarly, Igan et al. (2012) show that lobbying banks originate mortgage loans that are approximately 8% riskier. Overall, our findings support Hypothesis 1 that connected banks are

[18] For example, in 2005, there are 258 banks in our analysis. Therefore, the ventile-year fixed effects identifies the variation in sensitivity of bank leverage to risk for changes in the number of bank directors with public service experience split by asset size (approximately 13 banks per size group).

[19] These percentages are calculated as: [(-9.4+0.57)/-9.4]-1 and [(-11.1-0.92)/-11.1]-1, respectively.

better able to capture regulators and increase their level of risk. This can lead to capital arbitrage by holding less capital as asset risk increases.

4.2 Changes in Connections and Risk-shifting

A lower sensitivity of leverage to risk is a necessary but insufficient condition for connected banks to extract subsidies from the financial safety-net. For this to occur, banks need to be able to increase the value of their put option onto the taxpayer.

< INSERT TABLE 3 HERE >

Table 3 reports results from estimating Equation (6) (Hypothesis 2). The coefficient on σ_V is positive and significant at the 1% level in Columns (1) and (7).[20] This indicates that by increasing asset risk, banks are able to extract larger public subsidies from the safety-net. Our key coefficient of interest in Columns (1) to (6), on *Fed Gain x* σ_V, is positive and statistically significant at the 1% level. This indicates that increases in the number of directors on a bank's board with Fed public service experience increases a bank's gain from risk-shifting to the safety-net. In Columns (7) to (12), we observe similar results. A reduction in connections to the Fed leads to decreases in risk-shifting to the safety-net (as observed by the negative coefficient on *Fed Loss x* σ_V).

As previously, our specifications estimate the effects of gains and losses of Fed connections within- and across-banks as well as well as within 20 bank size groups and within groups of banks supervised by the same regulator in the same state in the same year. The economic significance is also sizable. For instance, in Columns (5) and (11), a gain (loss) in

[20] The coefficient on σ_V is not significant in the other columns because we interact all of the control variables with σ_V. Therefore, its significance needs to be jointly estimated.

connections to the Fed increases (decreases) the gains from risk-shifting by 17.3% (15.9%).[21] The results in this section show that captured banks are better able to shift risk to the safety-net and access larger public subsidies. This leads to socially adverse outcomes because the taxpayer is subsidizing risk-taking by banks that are connected.

5. Effects of Retirements of Reserve Bank Presidents on Risk-taking and Risk-Shifting

5.1 Retirements of Reserve Bank Presidents

Our empirical set-up does not allow us to interpret our results as a clean causal effect of public service connections on risk-shifting. Public service connections are not randomly assigned to banks and their establishment could be correlated with omitted variables that are related with bank risk, leverage and risk-shifting. Therefore, we use a separate empirical strategy in this section to corroborate our findings.

We exploit the planned retirements of regional Reserve Bank Presidents as shocks to the quality of existing bank connections. The timing of planned retirements, when Reserve Bank Presidents having reach retirement age, are largely outside the control of Presidents (and banks), and are therefore plausibly exogenous to bank risk-shifting or supervisory effectiveness.[22] Since planned retirements arise due to term-limits and span different geographical locations and years, it is less likely that these retirements coincide with time-

[21] These percentages are calculated as: [(-1.637+0.283)/-1.637]-1 and [(-2.52-0.4)/-2.52]-1, respectively.

[22] "Reserve Bank presidents are subject to mandatory retirement upon becoming 65 years of age. However, presidents initially appointed after age 55 can, at the option of the board of directors, be permitted to serve until attaining ten years of service in the office or age 75, whichever comes first". https://www.federalreserve.gov/aboutthefed/bios/banks/default.htm

variant omitted variables that are correlated with connections or risk-shifting (we include bank fixed effects). While we are unable to design an experiment that randomly allocates connections to banks, relying on the retirements of Fed Presidents is still useful because it provides external variation to the quality of public service connections that have been endogenously established.

Crucially, the planned retirement of a regional Reserve Bank President should decrease the ability of a connected bank to shift risk. A Reserve Bank President is arguably the single most powerful Fed officer within their district and, if personal familiarity with a President gives rise to benefits to a connected bank, the connection will be less conducive to risk-shifting post-retirement. We therefore predict that banks with connections will experience a decrease in gains from risk-shifting if the President of a particular Reserve Bank retires, compared to a control group of banks without connections that are located in the same Federal Reserve district.

< *INSERT TABLE 4 HERE* >

We adopt a difference-in-differences (DiD) strategy to analyze how connections affect risk-shifting following a negative shock to the quality of existing connections. Crucial to our empirical set-up is that *within* each of the 12 Reserve Bank districts, some banks are connected to the Reserve Bank from which the President retires while other banks are not. Our set-up therefore exploits variation in the quality of bank connections within each of the 12 regional Reserve Bank districts. An advantage of this identification strategy is that we are comparing connected banks to themselves before the shock and to a group of control banks. Further, there are multiple planned retirements affecting different banks that are supervised by different Federal Reserve districts across time. This alleviates concerns that omitted variables coinciding with a single retirement are correlated with risk-shifting.

We identify the years in which Reserve Bank Presidents retire from Federal Reserve documents and their corresponding websites. We classify a retirement as "planned" if the President retired up to 1 year before the maximum retirement age. Using this criterion, we classify the retirements of 7 regional Reserve Bank President as planned (listed in Panel B of Table 4).[23] We conduct searches on Factiva and various news websites to confirm that the retirements were previously planned rather than forced and perhaps related to aspects of supervisory effectiveness.

We perform the DiD tests using variants of the following model:

$$B/V_{i,k,t} \text{ or } IPP_{i,k,t} = \alpha + \beta_1 \sigma_{Vi,k,t} + \beta_2 Treated_{i,k,t} + \beta_3 Post_{k,t} + \beta_4 Treated_{i,k,t} \times Post_{k,t} + \beta_5 Treated_{i,k,t} \times \sigma_{Vi,k,t} + \beta_6 Post_{k,t} \times \sigma_{Vi,k,t} + \beta_7 Treated_{i,k,t} \times Post_{k,t} \times \sigma_{Vi,k,t} + Bank\ Controls_{i,k,t} + Fixed\ Effects + \varepsilon_{i,t} \quad (7)$$

where *i*, *k* and *t* indexes bank, Federal Reserve district and year respectively. We use a unbalanced 5-year window (*t*-2, *t*-1, *t*, *t*+1, *t*+2) around the year the regional Reserve Bank President retires (year *t*). *Post* is a dummy variable that equals 0 for years *t*-2 *and t*-1 and takes the value of 1 for years *t* to *t*+2 by Fed District. For instance, the President of Richmond Fed, Mr Broaddus, retired in 2004. Banks under the Richmond Fed take *Post* values of 0 for years 2002-2003, and values of 1 for years 2004-2006.

[23] Our original sample consists of 14 retirements. We exclude Timothy Geithner (Fed Bank of New York President in 2008 who later took up the position of Secretary of the Treasury), Janet Yellen (Fed Bank Of San Francisco President in 2010 who took up positions as Vice Chairman, then Chairman of the Board of Governors of the Federal Reserve System) and Thomas Hoenig (Fed Bank of Kansas President in 2011 who late become Vice Chairman of the FDIC) as they constitute "reassignments" within regulatory agencies. We further exclude 4 Fed President Retirements as they do not coincide with our definition of "planned" retirements, because these Presidents left the job "early". Out of these 7 planned retirements we identify (and use for our analysis), 6 Presidents served till their maximum tenure age. Only 1 retired 1 year before the maximum tenure age.

We allocate banks to the treatment group *Treated (Treated* = 1) if they have at least one member of the board who has served alongside the outgoing President in a public service role in the 5-year DiD window surrounding the retirement. Additionally, treated banks must be located in the Fed district which the retiring President was in charge of. This definition therefore ensures that our treatment group has bank directors that served alongside the outgoing President.

The group of control banks (*Treated* = 0) are banks which are located in the district of the retiring President but have no public service connections to the Reserve Bank over the 5-year window. Our main variable of interest is the triple interaction term *Treated x Post x* σ_V which shows how the marginal effects of Reserve Bank President retirements on the sensitivity of *B/V* and *IPP* to σ_V differ between treated banks and non-connected control banks.

5.2 Retirements of Reserve Bank Presidents, Bank Risk-taking and Risk-shifting Results

We show summary statistics for both our treated and control groups in *t*-1 (the year before retirement) in Panel A of Table 4. In total, we have 26 treated and 88 control banks. Importantly, the means of $\Delta B/V$, $\Delta\sigma_V$ and ΔIPP, our variables of interest, are not statistically different between treated and control banks. While the parallel trends assumption is not directly testable, this provides some support for the assumption which requires trends in outcomes to be similar for both the control and treatment groups prior to the shock. We further observe that some differences in covariates exist between treated and control groups prior to the shock, the most salient of which is bank size. Treated banks tend to be larger than control banks. This is unsurprising as larger banks have increased chances of obtaining Reserve Bank directorships (Adams, 2017) as well as advisory council positions.

Fortunately, the DiD set-up lets us compare banks to themselves before and after a shock; differences in characteristics between banks are therefore differenced out (Roberts and Whited, 2012).[24] To further alleviate concerns that differences in bank characteristics could affect risk-shifting differentially after retirements, we interact our *Bank Controls x* σ_V variable with *Post*. Doing so ensures that we control for the possibility that different bank characteristics could produce different reactions to the shock.

Panel C of Table 4 shows the results for risk-taking (leverage-risk sensitivity, Columns (1) to (5)) and risk-shifting, Columns (6) to (10). The coefficient on *Treated x Post x* σ_V is negative in most specifications in Columns (1) to (5), indicating that the leverage at connected banks shows a higher sensitivity to risk *following* negative shocks to connections. In Columns (6) to (10), the coefficient on *Treated x Post x* σ_V is also negative and statistically significant throughout different specifications. Thus, the gains from risk-shifting decrease at connected banks relative to our control group after the retirement of their respective regional Reserve Bank Presidents.

The results are robust to the inclusion of different fixed effects. For instance, in Columns (1) to (2) and (6) to (7), we include bank, regulator and year fixed effects (with and without control variables). In Columns (3) and (8), we include bank, state-year and regulator-year fixed effects. In Columns (6) and (10), size ventile-year, state and regulator fixed effects are included. Overall, the findings are consistent with our predictions that connections facilitate

[24] While we are aware that differences in observable characteristics between treated and control banks could hint that unobservable omitted variables exist and bias our results, this is unlikely as we include a multiplicity of fixed effects in our estimations which minimizes this issue. For instance, in Panel A of Table 4, we observe that treated banks tend to be larger. In our estimations, we include bank as well as size ventile-year fixed effects, which means that we are estimating the treatment effects within size groups, thereby alleviating concerns that size might be correlated with both risk-shifting and regulatory connectedness.

risk-shifting and that a negative shock to the efficacy of existing connections reduces opportunities to shift risk.

Finally, we conduct a dynamic timing-effects test to ascertain that the treatment effects of the DiD estimation are due to planned retirements as opposed to some omitted variable or other events that might coincide with the timing of the retirement. We follow Bertrand and Mullainathan (2003) and replace our *Post* variable with four indicator variables; $Post_{t-1}$, $Post_t$, $Post_{t+1}$, $Post_{t+2}$. These variables equal 1 for the relevant year with respect to the retirement, and 0 otherwise. We interact the variables with *Treated x* σ_V. The results are in Panel D of Table 4. As observed, the reduction in risk-shifting gains at connected banks is mostly detectable in the second year *after* a President retires. Crucially, there are no effects in the pre-shock period, ruling out concerns of reverse causality.

While we attempt to establish a causal link between public service connections and bank risk-taking and shifting through our DiD setup, we are nonetheless aware that it does not allow us to unambiguously infer causality. However, our evidence provides insights into an important phenomenon of economic interest. At a minimum, our results imply that regulators can identify sizable increases in bank risk-shifting by focusing on banks that have established public service connections.

6. Risk-taking and Risk-shifting in the Post-Crisis and Bailout Period

In this section, we investigate whether the extensive bailouts and subsidies provided to the financial sector during the crisis of 2008 altered the regulatory environment, thereby incentivizing Fed connected banks to increase risk-taking and shifting. We go on to test if these effects are stronger for Fed connected banks that were bailed out.

In 2008, the Emergency Economic Stabilization Act (EESA) was enacted in response to the financial crisis. To stabilize the economy, EESA contained multiple provisions, including the largest taxpayer-financed bailout in US history (cf. Duchin and Sosyura, 2012; 2014), increased insurance coverage limits for depositors (cf. Lambert et al., 2017) as well as short-term lending to banks (cf. Berger et al., 2017).

We hypothesize that after the enactment of EESA, increases in connections to the Fed will increase risk-taking and shifting *more* relative to before the crisis. Our expectation follows the well-documented moral hazard effect of public guarantees on increased bank risk-taking (Gropp et al., 2011; 2014; Dam and Koetter, 2012). Importantly, the literature has demonstrated that EESA has led to an increase in moral hazard and risk-taking at US banks (Duchin and Soysura, 2014; Lambert et al., 2017). Furthermore, EESA signaled the willingness of regulators to engage in forbearance during crisis times (Archarya and Yorulmazer, 2007; Brown and Dinç 2011). If there are benefits of laxity in regulatory scrutiny brought upon by connections with the Fed, we should expect this to be stronger in the presence of heightened regulatory forbearance and moral hazard.

< INSERT TABLE 5 HERE >

We estimate variants of the following equation with various fixed effects to test our hypothesis that EESA altered risk-taking and shifting incentives in the financial sector:

$$B/V \text{ or } IPP_{i,t} = \alpha + \beta_1\sigma_{Vi,t} + \beta_2 \text{ Fed Gain (Loss)}_{i,t} + \beta_3 \text{ Post-Crisis}_{08\text{-}13} + \beta_4 \text{Fed Gain (Loss)}_{i,t} \text{ x Post-Crisis}_{08\text{-}13} + \beta_5 \text{Fed Gain (Loss)}_{i,t} \text{ x } \sigma_{Vi,t} + \beta_6 \text{ Post-Crisis}_{08\text{-}13} \text{ x } \sigma_{Vi,t} + \beta_7 \text{Fed Gain (Loss)}_{i,t} \text{ x Post-Crisis}_{08\text{-}13} \text{ x } \sigma_{Vi,t} + \text{Bank Controls}_{i,t} + \text{Fixed Effects} + \varepsilon_{i,t} \quad (8)$$

where *Post-Crisis*$_{08\text{-}13}$ is a dummy variable that equals 1 for years 2008 to 2013 and 0 otherwise.[25] Our main variables of interest are the interaction terms *Fed Gain* (*Loss*) *x Post-Crisis*$_{08\text{-}13}$ *x* σ_V which indicates if increases (decreases) in connections to the Fed increase (decrease) the gains from risk-taking and shifting in the post-crisis period.

The results are shown in Panel A of Table 5. The coefficient on *Fed Gain x Post-Crisis*$_{08\text{-}13}$ *x* σ_V is statistically significant in Columns (1) to (3) and (7) to (9). This supports our prediction that following EESA, connections to the Fed led to greater gains from risk-shifting compared to before the Act (Columns (7) to (9)). This is due to decreases in the sensitivity of leverage to risk (Columns (1) to (3)). The opposite results are observed when connections to the Fed are lost (negative sign on *Fed Loss x Post-Crisis*$_{08\text{-}13}$ *x* σ_V) in Columns (4) to (6) and (10) to (12). Note that our results control for banks that receive bailout funds in 2008 and 2009 (*CPP*$_{08\text{-}13}$ *x* σ_V). Therefore, our analysis identifies the risk-taking and shifting effects of Fed connections post-crisis, after controlling for the moral hazard effects stemming from bailout support that individual institutions received.

In Panel B of Table 5, we directly test the conjecture that conditional on receiving bailout funds in the crisis, risk-taking and shifting *increased* at Fed connected banks. Duchin and Soysura (2014) show that bailed-out banks make riskier loans compared to banks that did not receive bailout funds. The authors conduct various tests and conclude that increase in moral

[25] In unreported results, we find similar results when we define *Post-Crisis* as 2009-2013, 2010-2013 or 2011-2013.

hazard contributed to the increase in risk-taking at bailed out banks, in line with theoretical predictions by Acharya and Yorulmazer (2007). Subsequently, we expect that the increases in moral hazard at bailed-out banks due to the upward revision of probability of future bailouts would be exacerbated for Fed connected banks (Bayazitova and Shivdasani, 2012).

This is what we observe in Panel B. The coefficient on the triple interaction term *Fed Gain* (*Loss*) $x\ CPP_{08\text{-}13}\ x\ \sigma_V$ is positive and significant in Columns (1)-(3) and (7)-(9) and negative in Columns (4)-(6) and (10-12). Risk-taking and shifting is stronger (weaker) for banks that increase (decrease) connections to the Fed in the post-crisis period *after* they receive bailout funds. Given that the Fed still continues to rely on bankers to serve in public service roles, one implication of these findings is that these institutional arrangements became potentially more precarious for supervisors, and more valuable for banks, after the crisis.

7. Additional Analysis on Risk-shifting to Taxpayers: Evidence from Shareholders and Debtholders

In this section, we present two additional sets of results, involving: 1) shareholder risk exposure, and; 2) debtholders' required rate of returns, to buttress our interpretation that banks utilize public service connections to the Federal Reserve to shift risk to the taxpayer.

7.1 Riskier Bank Activities and No Increase in Equity Risk

The model proposed by Merton (1977) is useful in measuring risk-shifting from *equity holders* to the *taxpaye*r through a specific channel; a reduction in the sensitivity of bank leverage to changes in bank risk. To corroborate our main findings, we first show that Fed connected banks do increase their risk-taking through various policies. Second, we show that although connected banks undertake riskier policies, equity holders do not view these banks as riskier, implying that risk has been shifted to the taxpayer.

We employ the standard deviation of ROA (σROA, Columns (1) to (2) of Table 6), growth in loans ($\Delta Loans$, Columns (3) to (4)), bad loans ($\Delta Bad\ Loans$, Columns (5) to (6)), risk-weighted assets (ΔRWA, Columns (7) to (8)) and non-interest income ($\Delta NI\ Income$, Columns (9) to (10)) as proxies for risky bank policies.[26] For instance, Demirguc-Kunt and Huizinga (2010) find that high levels of non-interest income leads to greater risk, while Fahlenbrach et al. (2017) report that high loan growth rates precedes lower quality lending and worse bank performance.

< INSERT TABLE 6 & 7 HERE >

Table 6 show that banks that gain (lose) connections to the Fed (Panel A and B respectively) engage in riskier (safer) activities. Banks that gain (lose) connections have higher (lower) standard deviation on ROA as well as higher growth rates in loans, bad loans, risk-weighted assets and non-interest income. Further, the results are economically significant. For instance, upon establishing Fed connections, the growth in risk-weighted assets (RWA) increases by 50% as compared to the mean (Column (8) of Panel A). One additional advantage of this analysis that complements our main findings is that we are able to shed light on *how* banks become riskier; they do so through aggressively growing their loan book, risky assets and non-interest income.

[26] Refer to Appendix A for the construction of these variables.

Absent risk-shifting to the taxpayer, we would expect riskier activities to be linked to higher risk exposures for equity holders. However, Table 7 shows that changes in public service connections to the Fed do not lead to higher equity risk. We use two market measures of risk exposures to equity investors. First, we compute *Tail Risk* (Columns (1) to (2) and (5) to (6)) as the negative of the average return on the BHC's stock during the worst 5% trading days of the year. Second, we compute *σStock Rets* (Columns (3) to (4) and (7) to (8)) as the standard deviation of the daily stock returns of the BHC's stock over the year. In all columns, we show that gains and losses of Fed connections are not associated with increases (decreases) in either market risk measure. Taken together, the results in this section supports the risk-shifting narrative we document in the previous sections; taxpayers (and not bank shareholders) absorb the higher risk exposures of connected banks.

7.2 No Increase in Rate of Return Required by Depositors

A body of evidence suggests that depositors (both insured and uninsured) respond to changes in bank risk (e.g., Hannan and Hanweck, 1988; Cook and Spellman, 1994; Berger and Turk-Ariss, 2015; Danisewicz et al., 2017).[27, 28] However, if risk-shifting to taxpayers occurs, as measured by increases in *IPP*, it implies that discipline imposed by debtholders is insufficient to offset banks' incentives to increase risk. We provide support for this assertion by showing

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[27] Hanna and Hanweck (1998) and Cook and Spellman (1994) show that insured and uninsured Certificate of Deposits issued by US banks reflect the bank's riskiness. Berger and Turk-Ariss (2015) show that depositor discipline was present in the US prior to the crisis. Danisewicz et al. (2017) uncover that both insured and uninsured depositors respond to changes in the priority of their claims on a bank's assets.

[28] Broadly, this relates to the extensive literature on market discipline. See Flannery and Bliss (2019) for an excellent review.

that depositors (both insured and uninsured) do not increase their required rate of return when banks establish connections to the Fed.

Because deposits of less than $100,000 were insured before the year 2008 (the limit was increased to $250,000 in October 2008), we use the 3, 6 and 12-month interest rates offered on Certificate of Deposits with a nominal value of $10,000 as proxies for the rate of return required on insured deposits (*3, 6, 12mthCD%(10k),* Columns (1) to (6) of Table 8).[29] In addition, we also use the total interest expense on all time deposits below $100,000 scaled by total time deposits below $100,000 (*Int. Exp. Time Depo.<100k,* Columns (7) to (8)). As a proxy for the rate of return required on uninsured deposits, we use the total interest expense on time deposits above $100,000 scaled by total time deposits above $100,000 (*Int. Exp. Time Depo.>100k* Columns (9) to (10)). We restrict the analysis for uninsured deposits to years before 2009 before the limit was increased to $250,000. Unfortunately, we do not have interest rates on CDs that are above $100,000 throughout our sample period. Finally, to capture the total interest expense paid on all funds (deposits and non-deposits), we use *Total Int. Exp*, defined as the total interest expense scaled by total liabilities in Columns (11) to (12).

< INSERT TABLE 8 HERE >

It is quite clear from results displayed in both Panel A (*Fed Gain*) and Panel B (*Fed Loss*) of Table 8 that there is no relationship between the required rate of return on deposits (both insured and uninsured) and Fed connections. This supports our narrative that risk is shifted to the taxpayer. If increases in Fed connections lead to increases in riskiness for

[29] We only have data on the rates offered for CDs with a nominal value of $10,000. The data is obtained from S&P Global.

depositors, they would require a higher rate of return on their deposits at connected banks.[30] Overall, our findings are consistent with the notion that risk at Fed connected banks is shifted to the taxpayer. Despite undertaking riskier policies, debtholders (and shareholders) do not view connected banks as riskier.

8. Additional Tests

We conduct various additional tests which we produce in an Internet Appendix (IA). See Appendix A for details on the construction of the additional variables that we employ. Tables IA.1 to 3 use alternative proxies for connections to the Fed. Table IA.1 re-runs our analysis using gains (losses) in *current* connections to the Fed (*Current Fed Gain* (*Loss*)) rather than just a gain (loss) in all types (current and non-current) connections. We observe that risk-taking and shifting increases when a director obtains public service positions in the Fed. Unsurprisingly, stepping down from Fed positions does not lead to a decrease in risk-taking and shifting; bank directors would still have enduring connections that confer benefits brought upon by association with the Fed.

Tables IA.2 and IA.3 estimate the effects of gains (and reductions) of public service connections established through the different roles that bank directors can undertake; Reserve

[30] It is worth noting that even if we were to observe that debtholders increase their required rate of return in response to increases in Fed connections, this is *not* enough to conclude that risk-shifting to the taxpayer did not occur. The increase in interest require by debtholders could still not be enough to deter risk-shifting to the financial safety-net. The fact that we did not observe an increase is therefore stronger evidence that risk-shifting to the taxpayer increases at connected banks.

Bank directorships and advisory council positions, respectively. We continue to find largely similar results across both positions that directors can undertake at the Fed.

Table IA.4 controls for other forms of connections between banks and supervisors. We control for revolving door connections of former regulators (e.g., Shive and Forster, 2017) (*Ex-Regulator Gain (Loss)*), former politicians (e.g., Duchin and Sosyura, 2012) (*Politician Gain (Loss)*), and the amount banks spend on lobbying (e.g., Lambert, 2018) (*Lobby%*). We continue to find similar results.

Table IA.5 controls for the effects of market discipline (e.g., Ashcraft, 2008). An alternative explanation for some of our findings is that increases in regulatory connections lead to less discipline exerted by market participants.[31]As proxies for creditor discipline we use subordinated debt (*Sub Debt*) and core deposits not typically covered by federal deposit insurance (*Core Deposits*). Our results remain robust even when controlling for market discipline.

In Table IA.6, we include additional board characteristics that could be correlated with risk-taking and serving in the Fed to alleviate additional concerns of omitted variables. For instance, boards that have directors who serve (or have served) in the Fed are likely to have higher ability or more be more diverse, which has also been shown to influence risk-taking. As controls for the composition of the board, we include the % of women on the board (e.g., Faccio et al., 2016), board age and qualifications (e.g., Berger et al., 2014), financial experts (e.g., Minton et al., 2014) and board seats (e.g., Fich and Shivdasani, 2006; Field et al., 2013) (*Board*

[31] Note that this explanation is not necessary at odds with our interpretation of a reduction in supervisory effectiveness. If markets expect that regulators would bail out connected banks in times of crisis, they would monitor less stringently.

Female%, *Board Age*, *Board Avg. Quals.*, *Board Fin. Experts%* and *Board Avg. Seats*). Comfortingly, our findings continue to hold.

Table IA.7 includes other observable CEO characteristics that could be correlated with serving at the Fed. For instance, CEOs with better educational backgrounds could be more likely to serve, and, simultaneously, pursue riskier policies. We control for CEO educational quality and attainment (*CEO MBA* and *CEO Ivy League UG*) (e.g., King et al., 2016), age (e.g., Serfling 2014) (*CEO Age*), overconfidence (e.g., Ho et al., 2016) (*CEO Overconfidence*), whether the CEO was born in the great depression (e.g., Malmendier et al., 2011) (*CEO Depression Baby*), and whether the CEO started her career during a recession (e.g., Schoar and Zuo, 2017) (*CEO Crisis Career Starter*). We also control for compensation incentives of the CEO (*CEO Log(Salary), CEO Log(Vega)* and *CEO Log(Delta)*) as they could affect bank policies (e.g., Hagendorff and Vallascas, 2011). Our results remain quantitatively similar.

Table IA.8 includes several county-level variables (religiosity, Herfindahl-Hirschman Index (HHI), unemployment rate, income per capita) to address concerns of omitted variables at the county level (e.g., Mian and Sufi, 2009; Adhikari and Agrawal, 2016; Bushman et al., 2016). Our results continue to hold. Finally, the analysis in Tables IA.9 and IA.10 exclude the crisis years (2007-2008) and the worst performing banks, respectively. In each of these additional regressions, our results continue to hold.

9. Conclusion

This study investigates if connections established while bank directors hold public service positions in the Federal Reserve leads to regulatory capture, and subsequently, to banks accessing larger subsidies from the financial safety-net. We demonstrate that banks that gain public service connections hold less capital for a given increase in risk as compared to non-connected banks. As a result, these banks are able to shift risk to the financial safety-net and extract larger public subsidies. We also show that although connected banks undertake riskier business models, such banks are not viewed as riskier by equity investors and debtholders. The latter finding supports a risk-shifting narrative where taxpayers (rather than equity investors or debtholders) absorb some of the risk exposures of connected banks.

Our study draws attention to the darker side of interactions between regulators and bank directors and has two main policy implications. First, while our approach may not be able to unambiguous establish causality, or pinpoint the immediate channel through which connections facilitate risk-shifting, our investigation still highlights an important issue. At a minimum, we document robust correlations which demonstrate that, irrespective of the exact channel(s) at play, connections between regulators and bankers warrant more scrutiny. That is, even if the relationship between connections and risk-shifting were not causal, the documented relationship is statistically robust and has a clear implication: connected banks require additional scrutiny to prevent costly risk-shifting to the financial safety net.

Second, the fact that connected banks can shift risk on the back of connections established through public service roles—which carry no formal decision-making powers over matters of supervision or enforcement—is particularity notable. It suggests that attempts to tackle the risk-shifting effects we show, by further restrictions on the remit of bank directors, are unlikely to be effective in reducing gains to banks from connections with the Fed. Instead, questions are justified over whether the time-honored practice of granting banks a privileged role in the governance of the Fed, that are presumably intended to improve rather than undermine regulatory oversight, should continue.

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Table 1
Summary Statistics

This table contains summary statistics of key variables (Panel A to C) and description of the public service positions bank directors undertaken while at the Federal Reserve (Panel D). Refer to Appendix A for construction and definition of these variables. The sample period is 2001 to 2013. N is the number of bank-year observations, p1 and p99 are the 1st and 99th percentiles. Panel A show summary statistics of the variables used in this study. Panel B and C presents more detailed summary statistics on Federal Reserve connections. Panel D show the public service positions that bank directors are currently serving or has previously served in at the Federal Reserve.

Panel A: Summary Statistics	(1) N	(2) mean	(3) Std. Dev.	(4) p1	(5) p50	(6) p99
Connection variables						
Fed Gain	2359	0.035	0.183	0	0	1
Fed Loss	2539	0.023	0.149	0	0	1
Current Fed Gain	2359	0.03	0.17	0	0	1
Current Fed Loss	2359	0.029	0.167	0	0	1
Fed Directorship Gain	2359	0.025	0.154	0	0	1
Fed Directorship Loss	2359	0.017	0.128	0	0	1
Fed Advisory Gain	2359	0.016	0.125	0	0	1
Fed Advisory Loss	2359	0.011	0.103	0	0	1
Ex-Regulator Gain	2359	0.009	0.098	0	0	0
Ex-Regulator Loss	2359	0.004	0.063	0	0	0
Politician Gain	2359	0.018	0.013	0	0	1
Politician Loss	2359	0.014	0.117	0	0	1
Financial variables (used and described in Appendix B)						
σE	2539	0.314	0.236	0.072	0.237	1.345
E (millions)	2539	4378	21467	8.4	290.1	137404.6
B (millions)	2539	34102	192724	306.2	2100	1233109
V (millions)	2539	37396	205806	334.7	2351.5	1373484
Financial variables						
IPP	2539	0.323	1.218	0	0.001	5.118
B/V	2539	90.289	6.753	73.627	90.178	103.285
σ_v	2539	3.323	2.595	0.567	2.799	12.553
Log Total Assets	2539	6.528	0.689	5.535	6.363	9.131
ROA	2539	0.005	0.014	-0.059	0.008	0.021
Total Deposits	2539	0.757	0.089	0.464	0.774	0.898
Tier-1 Capital	2539	0.09	0.025	0.046	0.088	0.149
Sub Debt	2539	0.042	0.087	0	0	0.344
Core Deposits	2487	0.788	0.13	0.259	0.82	0.955
Total Loans	2539	0.672	0.123	0.317	0.689	0.89
Bad Loans	2539	0.014	0.017	0	0.008	0.081
Market Risk	2539	0.109	0.175	-0.37	0.106	0.53
σStock Rets.	2539	2.761	1.822	0.852	2.108	9.091
Tail Risk	2539	5.82	3.727	1.695	4.542	18.572
ΔLoans	2359	0.003	0.004	-0.016	0.003	0.036
ΔBad Loans	2529	0.03	0.148	-0.212	0.008	0.498
ΔRWA	2359	0.004	0.009	-0.156	0.004	0.034
ΔNI Income	2359	0.003	0.014	-0.025	0	0.041
σROA	1765	-6.879	1.205	-8.976	-7.078	-4.084
Board variables						
Board Size	2539	11.846	3.343	6	11	21
Board Independence	2539	0.789	0.112	0.5	0.813	0.933
CEO Tenure	2539	6.752	6.067	0	4.9	26.9
CEO Duality	2539	0.496	0.5	0	0	1

Panel B: Federal Reserve connections summary statistics

	# bank-years with #Fed Public Service Bank Directors				
	0	1	2	3	4
# Bank Directors with Fed Public Service experience	2189	629	141	43	9
# Bank Directors with Fed Directorship Public Service experience	2317	493	101	42	4
# Bank Directors with Fed Advisory Council Public Service experience	2697	293	21	0	0

Panel C: Federal Reserve connections gain and lost summary statistics by year

Year:	02	03	04	05	06	07	08	09	10	11	12	13
# Banks that gain Fed Connections (*Fed Gain*)	5	6	4	11	11	8	5	5	7	15	5	6
# Banks that lost Fed Connections (*Fed Loss*)	1	2	3	4	7	9	5	7	6	4	6	3
# Banks with at least 1 Fed Public Service Dir.	39	44	45	70	75	68	68	68	64	68	49	58
# Banks	87	101	98	258	285	287	275	267	255	233	215	178

Panel D: Titles of Federal Reserve Bank Public Service positions in our dataset

Position	Position Served in:
Director (Reserve Bank Directorship Position)	Reserve Bank Board of directors
Advisor (Advisory Council Position)	Federal Advisory Council, New England Advisory Council, Community Depository Institution Advisory Council, Business and Community Advisory Council, Industry Councils Committee, Economic Advisory Council, Business Advisory Council, Small Business Advisory Council, Small Business and Agriculture Advisory Council, US Treasury and the Foreign Exchange Committee, International Advisory Committee, Investors Advisory Committee on Financial Markets, Community Depository Advisory Council, Community Bank Advisory Council, Small Bank Advisory Council, Labor, Education and Healthcare Advisory Council, Agriculture, Small Business and Labor Advisory Council, Thrift Institution Advisory Council, Consumer Advisory Council

Table 2

Table 2: Bank Risk-Taking: Sensitivity of Leverage to Risk at Fed Connected Banks

This table reports estimates of Equation (5) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V*) to portfolio risk (σ_v) at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $(B/V)_{i,t} = \alpha_0 + \alpha_1 \sigma_{Vi,t} + \alpha_2 \text{Fed Gain (Loss)}_{i,t\,x}\, \sigma_{Vi,t} + \alpha_3 \text{Fed Gain (Loss)}_{i,t} + \text{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *(B/V)* is the book value of leverage divided by market value of assets, σ_v is asset volatility, *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. *Bank Controls* is the vector of variables in each column. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*) and σ_v. Our variable of interest is the coefficient on the interaction term α_2 ($\text{Fed Gain (Loss)}_{i,t\,x}\, \sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant and level term for the control variables for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	B/V	B/V	B/V	B/V	B/V	B/V
Fed Gain x σ_v	0.680***	0.872**	0.603**	0.721**	0.571***	0.830**						
	[3.768]	[2.503]	[2.538]	[2.265]	[2.913]	[2.520]						
Fed Loss x σ_v							-0.646***	-0.831***	-1.041***	-0.808***	-0.917***	-0.837***
							[-3.678]	[-4.054]	[-6.242]	[-3.657]	[-6.036]	[-4.202]
σ_v	-0.188*	-12.150**	-8.549**	-14.300***	-9.412**	-14.316***	-0.084	-13.864***	-10.243***	-15.961***	-11.110***	-16.032***
	[-1.663]	[-2.432]	[-2.267]	[-2.817]	[-2.456]	[-2.786]	[-0.784]	[-3.413]	[-3.351]	[-3.765]	[-3.533]	[-3.832]
Tier-1 Capital x σ_v		-0.845	-0.659	-1.358	-0.834	-0.933		0.14	-1.197	-0.537	-1.316	0.014
		[-0.558]	[-0.299]	[-0.846]	[-0.395]	[-0.632]		[0.098]	[-0.435]	[-0.366]	[-0.517]	[0.010]
Bad Loans x σ_v		20.014***	14.237***	18.586***	12.376***	20.161***		20.276***	14.750***	19.124***	12.987***	20.490***
		[5.321]	[5.259]	[4.676]	[4.783]	[5.551]		[5.238]	[5.671]	[4.981]	[5.578]	[5.524]
ROA x σ_v		3.098	3.377	4.48	3.617	3.311		4.095	4.605**	5.567	4.892**	4.287
		[0.716]	[1.219]	[1.020]	[1.325]	[0.792]		[1.107]	[2.079]	[1.492]	[2.289]	[1.200]
Total Deposits x σ_v		1.246	0.577	1.301	1.070*	1.133		1.973*	1.212	1.934*	1.800**	1.819*
		[1.489]	[1.006]	[1.370]	[1.718]	[1.389]		[1.810]	[1.446]	[1.725]	[2.129]	[1.736]
Log Total Assets x σ_v		2.312*	1.704*	2.969**	1.894*	2.908**		2.359**	1.817**	3.052***	1.983**	2.974***
		[1.774]	[1.754]	[2.253]	[1.896]	[2.142]		[2.228]	[2.438]	[2.804]	[2.575]	[2.712]
Log Total Assets Sq x σ_v		-0.129	-0.095	-0.170*	-0.106	-0.172*		-0.119	-0.091*	-0.165**	-0.101*	-0.164**
		[-1.409]	[-1.400]	[-1.842]	[-1.507]	[-1.788]		[-1.621]	[-1.821]	[-2.195]	[-1.940]	[-2.142]
Total Loans x σ_v		-0.016	0.316	0.033	0.165	0.034		-0.098	0.293	-0.039	0.16	-0.052
		[-0.026]	[0.718]	[0.051]	[0.365]	[0.059]		[-0.163]	[0.753]	[-0.061]	[0.381]	[-0.091]
Board Size x σ_v		-0.036	-0.037**	-0.049*	-0.025	-0.028		-0.044*	-0.046***	-0.058**	-0.036**	-0.036
		[-1.445]	[-2.021]	[-1.865]	[-1.347]	[-1.113]		[-1.856]	[-2.718]	[-2.395]	[-2.179]	[-1.485]
Board Independence x σ_v		1.412**	0.971**	1.256**	0.69	1.519***		2.114***	1.623***	1.920***	1.357***	2.205***
		[2.451]	[2.020]	[2.128]	[1.397]	[2.714]		[3.597]	[3.425]	[3.212]	[2.831]	[3.860]
CEO Tenure x σ_v		0.002	0.004	0.008	0.008	0.004		0.008	0.009	0.014	0.015	0.01
		[0.178]	[0.483]	[0.612]	[0.994]	[0.374]		[0.554]	[0.919]	[0.914]	[1.399]	[0.694]
CEO Duality x σ_v		-0.139	0.044	-0.259	-0.044	-0.13		-0.164	-0.001	-0.281*	-0.076	-0.153
		[-0.854]	[0.370]	[-1.592]	[-0.407]	[-0.826]		[-0.930]	[-0.007]	[-1.680]	[-0.693]	[-0.904]
Market Risk x σ_v		-1.331***	-1.018***	-1.121***	-0.853***	-1.369***		-1.411***	-1.049***	-1.164***	-0.870***	-1.446***
		[-3.548]	[-4.010]	[-2.992]	[-3.217]	[-3.701]		[-3.493]	[-3.839]	[-2.946]	[-3.129]	[-3.664]
Bank Controls	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Bank FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes
Regulator FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes
Size Ventile-Year FE	No	No	No	No	No	Yes	No	No	No	No	No	Yes
State-Year FE	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Regulator-Year FE	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Adj. R-squared	0.606	0.731	0.764	0.747	0.799	0.737	0.597	0.726	0.764	0.745	0.799	0.733
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table 3

Risk-shifting to the Safety-net: Sensitivity of IPP to Risk at Fed Connected Banks

This table reports estimates of Equation (6) using panel OLS regressions (with different specifications) and examines the sensitivity of the value of public subsidies (*IPP*) to portfolio risk (σ_v) at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $(IPP)_{i,t} = \beta_0 + \beta_1\sigma_{Vi,t} + \beta_2 \text{Fed Gain (Loss)}_{i,t\ x}\,\sigma_{Vi,t} + \beta_3 \text{Fed Gain (Loss)}_{i,t} + \text{Bank Controls}_{i,t} + \varepsilon_{i,t}$ *where i* and *t* indexes bank and year respectively. *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility, *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. *Bank Controls* is the vector of variables in each column. Refer to Appendix A for description of variables and Appendix B for the construction of *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term β_2 ($\text{Fed Gain (Loss)}_{i,t\ x}\,\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant and level term for the control variables for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1) IPP	(2) IPP	(3) IPP	(4) IPP	(5) IPP	(6) IPP	(7) IPP	(8) IPP	(9) IPP	(10) IPP	(11) IPP	(12) IPP
Fed Gain x σ_v	0.318***	0.352***	0.301***	0.324***	0.283***	0.349***						
	[4.688]	[3.076]	[3.338]	[2.854]	[3.249]	[3.098]						
Fed Loss x σ_v							-0.282***	-0.223***	-0.399***	-0.216***	-0.400***	-0.220***
							[-6.121]	[-2.985]	[-6.553]	[-2.861]	[-6.738]	[-2.979]
σ_v	0.272***	-1.053	-1.222	-1.574	-1.637	-1.241	0.320***	-1.724	-2.067	-2.329*	-2.520*	-1.937
	[6.222]	[-0.621]	[-0.691]	[-0.937]	[-0.946]	[-0.715]	[7.396]	[-1.239]	[-1.516]	[-1.678]	[-1.854]	[-1.351]
Tier-1 Capital x σ_v		0.949**	-0.415	0.873*	-0.293	0.896**		1.338***	-0.673	1.246***	-0.521	1.281***
		[2.172]	[-0.457]	[1.933]	[-0.299]	[2.026]		[3.344]	[-0.607]	[3.320]	[-0.464]	[3.164]
Bad Loans x σ_v		5.367***	4.583***	5.295***	4.456***	5.391***		5.247***	4.623***	5.270***	4.664***	5.272***
		[5.184]	[4.285]	[4.711]	[3.710]	[5.265]		[4.593]	[4.424]	[4.666]	[4.396]	[4.660]
ROA x σ_v		0.732	0.689	0.894	0.755	0.777		1.064	1.234	1.287	1.369*	1.106
		[0.641]	[0.631]	[0.735]	[0.662]	[0.687]		[1.197]	[1.534]	[1.391]	[1.661]	[1.250]
Total Deposits x σ_v		0.26	0.441*	0.258	0.441*	0.235		0.596*	0.791**	0.597*	0.820**	0.570*
		[1.198]	[1.870]	[1.092]	[1.710]	[1.091]		[1.707]	[2.244]	[1.651]	[2.194]	[1.660]
Log Total Assets x σ_v		0.177	0.188	0.325	0.297	0.233		0.183	0.241	0.355	0.348	0.247
		[0.384]	[0.391]	[0.713]	[0.635]	[0.492]		[0.499]	[0.683]	[1.003]	[1.015]	[0.654]
Log Total Assets Sq x σ_v		-0.007	-0.007	-0.016	-0.013	-0.011		-0.002	-0.005	-0.013	-0.011	-0.007
		[-0.203]	[-0.195]	[-0.491]	[-0.397]	[-0.319]		[-0.074]	[-0.193]	[-0.536]	[-0.471]	[-0.248]
Total Loans x σ_v		-0.044	0.032	-0.097	-0.007	-0.033		-0.054	0.037	-0.104	0.005	-0.044
		[-0.319]	[0.196]	[-0.643]	[-0.037]	[-0.240]		[-0.367]	[0.252]	[-0.651]	[0.033]	[-0.298]
Board Size x σ_v		-0.010*	-0.008	-0.01	-0.008	-0.009		-0.013**	-0.012**	-0.014**	-0.013**	-0.012**
		[-1.674]	[-1.341]	[-1.642]	[-1.159]	[-1.554]		[-2.365]	[-2.231]	[-2.452]	[-2.237]	[-2.213]
Board Independence x σ_v		0.174	0.261	0.2	0.268	0.188		0.427***	0.556***	0.464**	0.588***	0.441***
		[1.239]	[1.574]	[1.310]	[1.476]	[1.346]		[2.606]	[3.202]	[2.584]	[3.156]	[2.690]
CEO Tenure x σ_v		0.001	0.002	0.002	0.003	0.001		0.004	0.004	0.005	0.007	0.004
		[0.372]	[0.538]	[0.877]	[1.126]	[0.450]		[0.788]	[1.048]	[1.136]	[1.542]	[0.831]
CEO Duality x σ_v		0.005	0.022	-0.01	0.004	0.004		-0.003	0.005	-0.017	-0.011	-0.003
		[0.106]	[0.440]	[-0.228]	[0.080]	[0.085]		[-0.056]	[0.099]	[-0.354]	[-0.251]	[-0.061]
Market Risk x σ_v		-0.286***	-0.369***	-0.286**	-0.363***	-0.287***		-0.328***	-0.393***	-0.319**	-0.375***	-0.330***
		[-2.735]	[-3.780]	[-2.583]	[-3.402]	[-2.761]		[-2.640]	[-3.811]	[-2.508]	[-3.517]	[-2.675]
Bank Controls	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Bank FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	No	No	No	Yes	No	No	No	No	No	Yes
State-Year FE	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Regulator-Year FE	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Adj. R-squared	0.533	0.742	0.762	0.74	0.764	0.744	0.497	0.711	0.751	0.712	0.756	0.713
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table 4
DiD Analysis: Reserve Bank Retirements as Shocks to Connections

This table reports summary statistics (Panel A), the year of Reserve Bank President retirements (Panel B) and estimates (Panel C and D) of the difference-in-difference (DiD) estimation (with different specifications) as described in Equation (7) and examines the sensitivity of leverage (*B/V*) and the value of public subsidies (*IPP*) to σ_v at treated banks compared to a group of control banks following shocks to the efficacy of Fed public service connections. The sample period is from 2001 to 2013. The DiD analysis is carried out over an unbalanced 5-year window (*t-2, t-1, t, t+1 and t+2)* where *t* is the year of Fed Reserve President retirements (7 shocks). *Post* is a dummy variable that is = 1 for years *t* to *t+2* and 0 otherwise. We define banks to be in the treatment group (*Treated* = 1) if banks: (1) have at least one director with Fed public service experience throughout the 5-year DiD window; (2) the Fed public service position held by the director overlaps with the tenure and Fed district of the outgoing Reserve Bank President. Banks in the control group (*Treated* = 0) are banks that do not have any directors with Fed public service experience in the 5-year DiD window and are in the district of the outgoing Reserve Bank President. Panel A report differences in means (and p-values) of the characteristics of treated and control banks in the pre-shock (*t-1*) year. Panel B show the year of Reserve Bank President retirements. Panel C present estimates of the DiD regression: $Y_{i,k,t} = \beta_0 + \beta_1\sigma_{Vi,k,t} + \beta_2 Treated_{i,k,t} + \beta_3 Post_{k,t} + \beta_4 Treated_{i,k,t} \times Post_{k,t} + \beta_5 Treated_{i,k,t} \times \sigma_{Vi,k,t} + \beta_6 Post_{k,t} \times \sigma_{Vi,k,t} + \beta_7 Treated_{i,k,t} \times Post_{k,t} \times \sigma_{Vi,k,t} + Bank\ Controls_{i,k,t} + \varepsilon_{i,k,t}$ where i indexes bank, *k* indexes Fed Districts and *t* indexes year. *Y* is (*B/V*) in Columns (1)-(5) and *IPP* in Columns (6)-(10). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt and σ_v is asset volatility. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with $\sigma_v \times Post$. Refer to Appendix A for description of variables and Appendix B for the construction of *B/V*, *IPP* and σ_v. Our variable of interest is the coefficient on the triple interaction term $\beta_7(Treated_{i,k,t} \times Post_{k,t} \times \sigma_{Vi,k,t})$. Panel D report estimates of a dynamic timing model. Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

Panel A: Summary statistics					
Variables	Pre-Shock Treated Fed		Pre-Shock Control		Difference in Means
	# Treated	Mean	# Control	Mean	(Treatment - Control)
ΔIPP	26	0.03	88	0.12	-0.09
ΔB/V	26	1.34	88	0.53	0.81
$\Delta\sigma_v$	26	-0.02	88	0.02	-0.04
σ_v	26	3.35	88	3.12	0.23
Bad Loans	26	0.007	88	0.009	-0.002
ROA	26	0.01	88	0.008	0.002
Total Deposits	26	0.72	88	0.75	-0.03
Market Risk	26	0.15	88	0.12	0.03
Tier1 Capital	26	0.079	88	0.085	-0.006*
Total Assets	26	6.99	88	6.46	0.53***
Total Loans	26	0.66	88	0.71	-0.05*
Board Size	26	13.4	88	11.8	1.6**
Board Independence	26	0.78	88	0.77	0.01
CEO Tenure	26	8.2	88	7.2	1
CEO Duality	26	0.80	88	0.52	0.28***

Panel B: Reserve Bank President Retirements	Year of Retirement
Federal Reserve Bank of New York, District 2	2003
Federal Reserve Bank of Richmond, District 5	2004
Federal Reserve Bank of San Francisco, District 12	2004
Federal Reserve Bank of Atlanta, District 6	2006
Federal Reserve Bank of Chicago, District 7	2007
Federal Reserve Bank of St. Louis, District 8	2008
Federal Reserve bank of Minneapolis, District 9	2009

Panel C: diff-in-diff	(1) B/V	(2) B/V	(3) B/V	(4) B/V	(5) B/V	(6) IPP	(7) IPP	(8) IPP	(9) IPP	(10) IPP
Treated x Post x σ_v	-0.892**	-0.356	-1.113**	-1.916***	-1.016**	-0.234**	-0.152**	-0.240**	-0.312***	-0.185***
	[-2.518]	[-1.098]	[-2.594]	[-3.165]	[-2.268]	[-2.497]	[-2.494]	[-2.096]	[-2.850]	[-4.220]
Treated x σ_v	0.11	-0.172	0.073	1.205***	0.519	-0.124*	-0.038	-0.134	0.003	-0.002
	[0.360]	[-0.667]	[0.233]	[3.313]	[1.453]	[-1.711]	[-0.793]	[-1.607]	[0.077]	[-0.053]
Post x σ_v	0.657***	1.787	0.766***	0.988***	-12.284	0.165**	-5.606***	0.222**	0.195*	-4.353***
	[3.141]	[0.197]	[2.671]	[2.624]	[-1.070]	[2.299]	[-3.226]	[2.510]	[1.931]	[-2.960]
σ_v	-0.809***	-14.014**	-0.766***	-1.915***	-17.093*	0.097	-1.056	0.063	-0.017	-0.926
	[-4.744]	[-2.193]	[-2.975]	[-7.847]	[-1.719]	[1.623]	[-1.057]	[0.768]	[-0.867]	[-1.517]
Treated x Post	1.386	0.323	2.927*	5.194**	3.028*	0.507	0.442*	0.74	0.771**	0.513***
	[1.077]	[0.277]	[1.898]	[2.555]	[1.974]	[1.572]	[1.956]	[1.591]	[2.234]	[3.163]
Post	-2.637***	-19.492	-1.802*	-3.957***	36.975	-0.690**	10.963**	-0.655	-0.527*	9.684**
	[-3.070]	[-0.703]	[-1.795]	[-3.028]	[1.036]	[-2.494]	[2.445]	[-1.619]	[-1.660]	[2.290]
Bank Controls x Post x σ_v	No	Yes	No	No	Yes	No	Yes	No	No	Yes
Bank FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
Year FE	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Regulator FE	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Size Ventile-Year FE	No	No	No	Yes	Yes	No	No	No	Yes	Yes
State-Year FE	No	No	Yes	No	No	No	No	Yes	No	No
Regulator-Year FE	No	No	Yes	No	No	No	No	Yes	No	No
Adj. R-squared	0.721	0.865	0.789	0.645	0.827	0.416	0.895	0.464	0.325	0.876
Observations	552	552	552	552	552	552	552	552	552	552

<u>Panel D: Dynamic Timing</u>	(1) B/V	(2) B/V	(3) B/V	(4) B/V	(5) B/V	(6) IPP	(7) IPP	(8) IPP	(9) IPP	(10) IPP
Treated x $Post_{t-1}$ x σ_v	0.403	0.147	0.204	-0.012	1.035	0.029	-0.035	0.014	-0.054	0.005
	[0.849]	[0.187]	[0.349]	[-0.021]	[0.884]	[0.572]	[-0.465]	[0.237]	[-0.998]	[0.120]
Treated x $Post_{t}$ x σ_v	-0.705	-0.247	-0.72	-1.679***	-0.041	-0.03	-0.144	-0.06	-0.131*	-0.102
	[-1.383]	[-0.288]	[-1.178]	[-2.704]	[-0.035]	[-0.395]	[-1.457]	[-0.530]	[-1.928]	[-1.454]
Treated x $Post_{t+1}$ x σ_v	-0.177	0.373	-0.373	-1.102	0.504	-0.051	-0.036	-0.076	-0.119	0.016
	[-0.325]	[0.459]	[-0.575]	[-1.558]	[0.422]	[-0.588]	[-0.314]	[-0.667]	[-1.338]	[0.179]
Treated x $Post_{t+2}$ x σ_v	-0.967	-0.271	-1.571*	-2.357***	-0.3	-0.431***	-0.350***	-0.458**	-0.535***	-0.274***
	[-1.539]	[-0.332]	[-1.906]	[-3.253]	[-0.241]	[-2.845]	[-2.944]	[-2.360]	[-3.253]	[-2.996]
Bank Controls x Dynamic Timeline x σ_v	No	Yes	No	No	Yes	No	Yes	No	No	Yes
Bank FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
Year FE	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Regulator FE	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Size Ventile-Year FE	No	No	No	Yes	Yes	No	No	No	Yes	Yes
State-Year FE	No	No	Yes	No	No	No	No	Yes	No	No
Regulator-Year FE	No	No	Yes	No	No	No	No	Yes	No	No
Adj. R-squared	0.742	0.885	0.803	0.671	0.822	0.514	0.921	0.553	0.461	0.9
Observations	552	552	552	552	552	552	552	552	552	552

Table 5
The effects of EESA on Risk-Taking and Risk-Shifting at Connected Banks

This table reports the results of estimates of Equation (8) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_V at Fed connected banks, following the enactment of the Emergency Economic Stabilization Act of 2008 (Panel A) and for Fed connected banks which that bailed out during the crisis (Panel B). The sample period is from 2002 to 2013. We estimate the following regression in Panel A: $Y_{i,t} = \beta_0 + \beta_1\sigma_{Vi,t} + \beta_2 Fed\ Gain\ (Loss)_{i,t} + \beta_3 Post\text{-}Crisis_t + \beta_4(Fed\ Gain\ (Loss)_{i,t}\ x\ Post\text{-}Crisis_t + \beta_5 Fed\ Gain\ (Loss)_{i,t}\ x\ \sigma_{Vi,t} + \beta_6 Post\text{-}Crisis_t\ x\ \sigma_{Vi,t} + \beta_7 Fed\ Gain\ (Loss)_{i,t}\ x\ Post\text{-}Crisis_t\ x\ \sigma_{Vi,t} + Bank\ Controls_{i,t} + \varepsilon_{i,t}$ and $Y_{i,t} = \beta_0 + \beta_1\sigma_{Vi,t} + \beta_2 Fed\ Gain\ (Loss)_{i,t} + CPP_{i,t} + \beta_4(Fed\ Gain\ (Loss)_{i,t}\ x\ CPP_{i,t} + \beta_5 Fed\ Gain\ (Loss)_{i,t}\ x\ \sigma_{Vi,t} + \beta_6 CPP_{i,t}\ x\ \sigma_{Vi,t} + \beta_7 Fed\ Gain\ (Loss)_{i,t}\ x\ CPP_{i,t}\ x\ \sigma_{Vi,t} + Bank\ Controls_{i,t} + \varepsilon_{i,t}$ in panel B where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility, *Post-Crisis* is a dummy variable that equals 1 for years 2008-2013 and 0 otherwise, *CPP* is a dummy variable that equals 1 for years 2008-2013 for banks that have received TARP bailout funds and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital*, *Bad Loans*, *ROA*, *Total Deposits*, *Log Total Assets*, *Log Total Assets Sq*, *Total Loans*, *Board Size*, *Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v *x Post-Crisis.* Refer to Appendix A for description of variables and Appendix B for the construction of *B/V*, *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term β_7 (*Fed Gain (Loss)*$_{i,t}$ *x Post-Crisis*$_t$ *x* $\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

Panel A: Post-EESA	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x Post-Crisis$_{08\text{-}13}$ x σ_v	1.396***	1.109***	1.250**				0.321***	0.258***	0.313***			
	[3.064]	[3.190]	[2.561]				[3.642]	[2.950]	[3.550]			
Fed Loss x Post-Crisis$_{08\text{-}13}$ x σ_v				-1.482***	-0.637**	-1.335***				-0.274***	-0.405***	-0.267***
				[-3.805]	[-2.408]	[-3.304]				[-4.559]	[-6.910]	[-4.432]
CPP$_{08\text{-}13}$ x σ_v	0.218	0.216**	0.214	0.308*	0.268*	0.301*	0.073*	0.071*	0.072*	0.107*	0.098*	0.106*
	[1.489]	[2.037]	[1.496]	[1.661]	[1.952]	[1.682]	[1.670]	[1.702]	[1.667]	[1.774]	[1.745]	[1.781]
Post-Crisis$_{08\text{-}13}$ x σ_v	-0.08	3.64	6.532	-0.519	3.28	5.373	-1.256	-0.592	-0.787	-2.104	-1.391	-1.734
	[-0.011]	[0.523]	[0.816]	[-0.069]	[0.477]	[0.632]	[-0.673]	[-0.314]	[-0.455]	[-1.418]	[-0.895]	[-1.229]
σ_v	-10.636	-10.856	-18.993**	-12.540*	-12.319*	-20.223**	0.108	-0.007	-0.604*	0.118	-0.072	-0.535
	[-1.474]	[-1.541]	[-2.262]	[-1.774]	[-1.852]	[-2.412]	[1.016]	[-0.009]	[-1.661]	[1.075]	[-0.090]	[-1.534]
Bank Controls x Post-Crisis$_{08\text{-}13}$ x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.773	0.791	0.778	0.77	0.79	0.776	0.775	0.794	0.777	0.758	0.787	0.761
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Panel B: Post-Bailout	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x $CPP_{08\text{-}13}$ x σ_v	1.632***	1.249***	1.446***				0.378***	0.316***	0.364***			
	[4.091]	[4.214]	[3.498]				[4.190]	[3.599]	[4.075]			
Fed Loss x $CPP_{08\text{-}13}$ x σ_v				-0.942***	-0.473*	-0.774*				-0.340***	-0.346***	-0.326***
				[-5.234]	[-1.817]	[-1.806]				[-5.545]	[-4.869]	[-5.259]
$CPP_{08\text{-}13}$ x σ_v	0.191	0.198*	0.191	0.317*	0.272**	0.309*	0.066	0.066	0.066	0.110*	0.102*	0.109*
	[1.311]	[1.880]	[1.333]	[1.710]	[1.975]	[1.718]	[1.528]	[1.583]	[1.529]	[1.827]	[1.807]	[1.833]
σ_v	-10.299	-10.775	-18.576**	-11.654*	-12.209*	-19.441**	0.177	0.057	-0.516	0.114	-0.051	-0.511
	[-1.387]	[-1.519]	[-2.154]	[-1.695]	[-1.854]	[-2.387]	[1.451]	[0.072]	[-1.345]	[0.996]	[-0.063]	[-1.493]
Bank Controls x Post-Crisis08-13 x σv	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.774	0.792	0.779	0.769	0.79	0.775	0.777	0.795	0.779	0.759	0.788	0.762
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table 6
Fed Connected Banks and Balance Sheet Risk

This table reports estimates using panel OLS regressions (with different specifications) and examines bank balance sheet risk at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \beta_0 + \beta_1 Fed\ Gain\ (Loss)_{i,t} + Bank\ Controls_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is *σROA* (measured as *(Log (Rolling standard deviation of ROA of the bank for the ahead 8 quarters)*) in Columns (1)-(2), Δ*Loans* (measured as *(Log Total Nominal Loans – Lag Log Total Nominal Loans)/(Lag Log Total Nominal Loans)*) in Columns (3)-(4), Δ*Bad Loans* (measured as *(Log Total Nominal Bad Loans – Lag Log Total Nominal Bad Loans)/(Lag Log Total Nominal Bad Loans)*) in Columns (5)-(6), Δ*RWA (*measured as *(Log Total Nominal RWA – Lag Log Total Nominal RWA)/(Lag Log Total Nominal RWA)*) in Columns (7)-(8) and Δ*NI Income (*measured as *(Log Total Nominal Non-Interest Income – Lag Log Total Nominal Non-Interest Income)/(Lag Log Total Nominal Non-Interest Income)*) in Columns (9)-(10). *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. Estimations of results with *Fed Gain (Loss)* are displayed in Panel A and B respectively. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variable. Our variable of interest is the coefficient on the term β_1 ($Fed\ Gain\ (Loss)_{i,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

Panel A: Connection Gain	(1) σROA	(2) σROA	(3) ΔLoans	(4) ΔLoans	(5) ΔBad Loans	(6) ΔBad Loans	(7) ΔRWA	(8) ΔRWA	(9) ΔNI Income	(10) ΔNI Income
Fed Gain	0.247**	0.163	0.003**	0.002*	0.028*	0.032*	0.003**	0.002**	0.004***	0.003**
	[2.315]	[1.585]	[2.388]	[1.866]	[1.801]	[1.944]	[2.419]	[2.168]	[2.688]	[2.427]
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Adj. R-squared	0.451	0.454	0.27	0.349	0.131	0.122	0.282	0.364	0.528	0.593
Observations	1,765	1,765	2,539	2,539	2,529	2,529	2,539	2,539	2,539	2,539

Panel B: Connection Loss	(1) σROA	(2) σROA	(3) ΔLoans	(4) ΔLoans	(5) ΔBad Loans	(6) ΔBad Loans	(7) ΔRWA	(8) ΔRWA	(9) ΔNI Income	(10) ΔNI Income
Fed Loss	-0.441***	-0.410***	-0.004**	-0.001	-0.016**	-0.016**	-0.003**	-0.001	-0.002*	-0.001
	[-3.738]	[-3.534]	[-1.994]	[-0.973]	[-2.509]	[-2.208]	[-1.996]	[-0.953]	[-1.874]	[-0.924]
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Adj. R-squared	0.453	0.458	0.271	0.348	0.13	0.121	0.282	0.363	0.526	0.592
Observations	1,765	1,765	2,539	2,539	2,529	2,529	2,539	2,539	2,539	2,539

Table 7
Fed Connected Banks and Market Risk

This table reports estimates using panel OLS regressions (with different specifications) and examines bank market risk at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \beta_0 + \beta_1 \textit{Fed Gain (Loss)}_{i,t} + \textit{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is *Tail Risk* (measured as the negative of the average return on the BHC's stock during the worst 5% trading days for the BHC over the year) in Columns (1)-(2) and (5)-(6), *σStock Rets*. (measured as the standard deviation of the daily stock returns of the BHC's stock over the year) in Columns (3)-(4) and (7)-(8). *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital*, *Bad Loans*, *ROA*, *Total Deposits*, *Log Total Assets*, *Log Total Assets Sq*, *Total Loans*, *Board Size*, *Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variable. Our variable of interest is the coefficient on the term β_1 ($\textit{Fed Gain (Loss)}_{i,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1) Tail Risk	(2) Tail Risk	(3) σStock Rets	(4) σStock Rets	(5) Tail Risk	(6) Tail Risk	(7) σStock Rets	(8) σStock Rets
Fed Gain	-0.129	-0.252	-0.047	-0.087				
	[-0.763]	[-1.468]	[-0.536]	[-0.975]				
Fed Loss					0.103	0.058	0.042	0.001
					[0.403]	[0.296]	[0.366]	[0.006]
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	Yes	No	Yes	No	Yes	No	Yes	No
Adj. R-squared	0.769	0.795	0.726	0.755	0.769	0.795	0.726	0.755
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table 8
Fed Connected Banks and Deposit Rates

This table examines bank deposit rates at Fed connected banks using panel OLS regressions (with different specifications). The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \beta_0 + \beta_1 Fed\ Gain\ (Loss)_{i,t} + Bank\ Controls_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is *3(6, 12)mthCD%* (interest rates required on 3 (6, 12) month Certificate of Deposits on $10,000) in Columns (1)-(2), (3)-(4) and (5)-(6), *Int. Exp. Time Depo. <100k* (measured as the Total Interest Expense on Time Deposits below $100,000 / Total Time Deposits below $100,000) in Columns (7)-(8), *Int. Exp. Time Depo. >100k* (measured as the Total Interest Expense on Time Deposits above $100,000 / Total Time Deposits above $100,000) in Columns (9)-(10) and *Total Int. Exp.* (measured as the Total Interest Expense / Total Liabilities) in Columns (11)-(12). *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. Estimations of results with *Fed Gain (Loss)* are displayed in Panel A and B respectively. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variable. Our variable of interest is the coefficient on the term β_1 (*Fed Gain (Loss)*$_{i,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

Panel A: Connection Gain	(1) 3mthCD% (10K)	(2) 3mthCD% (10K)	(3) 6mthCD% (10K)	(4) 6mthCD% (10K)	(5) 12mthCD% (10K)	(6) 12mthCD% (10K)	(7) Int. Exp. Time Depo. <100k	(8) Int. Exp. Time Depo. <100k	(9) Int. Exp. Time Depo. >100k	(10) Int. Exp. Time Depo. >100k	(11) Total Int. Exp.	(12) Total Int. Exp
Fed Gain	-0.035	-0.005	-0.054	-0.015	-0.058	-0.022	-1.325	-4.938	-0.061	0.095	0.00	0.011
	[-0.616]	[-0.082]	[-1.001]	[-0.256]	[-0.965]	[-0.359]	[-0.774]	[-1.224]	[-0.418]	[0.820]	[0.022]	[1.291]
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Adj. R-squared	0.849	0.876	0.887	0.911	0.904	0.925	0.0783	0.0081	0.0176	0.0266	0.815	0.912
Observations	1,130	1,130	1,192	1,192	1,200	1,200	2,539	2,539	1,391	1,391	2,539	2,539

Panel B: Connection Loss	(1) 3mthCD% (10K)	(2) 3mthCD% (10K)	(3) 6mthCD% (10K)	(4) 6mthCD% (10K)	(5) 12mthCD% (10K)	(6) 12mthCD% (10K)	(7) Int. Exp. Time Depo. <100k	(8) Int. Exp. Time Depo. <100k	(9) Int. Exp. Time Depo. >100k	(10) Int. Exp. Time Depo. >100k	(11) Total Int. Exp.	(12) Total Int. Exp.
Fed Lost	0.002	-0.009	0.051	-0.002	-0.018	-0.009	-3.777	-2.07	-0.185	0.007	0.025	0
	[0.018]	[-0.098]	[0.537]	[-0.016]	[-0.230]	[-0.098]	[-1.565]	[-0.947]	[-0.671]	[0.032]	[0.792]	[0.560]
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Bank FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Adj. R-squared	0.849	0.876	0.887	0.911	0.904	0.876	0.0792	0.00454	0.0176	0.0266	0.815	0.912
Observations	1,130	1,130	1,192	1,192	1,200	1,130	2,539	2,539	1,391	1,391	2,539	2,539

Appendix A
Variable Definitions and Sources

Variable Name	Definition	Source(s)
Connection Variables		
Fed Gain (Loss)	Dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise	Various
Current Fed Gain (Loss)	Dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board that is currently serving in public service positions at the Federal Reserve and 0 if otherwise	Various
Fed Directorship Gain (Loss)	Dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with Reserve Bank Directorship experience at the Federal Reserve and 0 if otherwise	Various
Fed Advisory Gain (Loss)	Dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with Federal Reserve Advisory Council experience at the Federal Reserve and 0 if otherwise	Various
Ex-Regulator Gain (Loss)	Dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with non-public service experience at any regulatory agency and 0 if otherwise	Various
Politician Gain (Loss)	Dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board who were politicians and 0 if otherwise. A politician is defined as having been Congressman (US Senators and US House Representatives), Deputy Secretary/Secretary of US Departments, US State Lieutenant Governors/Governors or US City Mayors)	Various
Lobby%	(Amount spent on lobbying / Total Assets) in %	Center for Responsive Politics
Financial Variables		
IPP	Fair value of the deposit insurance premium in % as described in Appendix B	CRSP, FR Y9-C
σ_v	Volatility of asset returns (annualized) in % as described in Appendix B	CRSP, FR Y9-C
(B/V)	(Book value of Liabilities / Market value of Assets) in %	FR Y9-C
Tier-1 Capital	Tier-1 Capital / Total Assets	FR Y9-C
Bad Loans	Sum of loans past due 90 days or more and nonaccrual loans / Total Assets	FR Y9-C
ROA	Return on Assets defined as the Income before extraordinary items / Total Assets	FR Y9-C
Total Deposits	Total Deposits / Total Assets	FR Y9-C
Log Total Assets	Natural logarithm of the book value of Total Assets	FR Y9-C
Log Total Assets Sq	Square of (Log Total Assets)	FR Y9-C
Total Loans	Total Loans / Total Assets	FR Y9-C
Core Deposits	(Core Deposits / Total Assets). Core Deposits include deposits held in domestic offices of the subsidiaries of the bank, excluding all time deposits of over $100,000 USD and any brokered deposits	FR Y9-C
Sub Debt	Book value of Subordinated debt / (Subordinated debt + Tier-1 Capital)	FR Y9-C
Market Risk	(Short term interest earning assets - Short term interest earning liabilities) / Total Assets	FR Y9-C
Tail Risk	Negative of the average return on the BHC's stock during the worst 5% trading days for the BHC over the year	FR Y9-C
3(6, 12)mthCD%(10k)	Interest rate (in %) offered on $10,000 Certificate of Deposits with a maturity of 3 (6, 12) months	S&P Global
Int. Exp. Time Deposits<100k	Interest expense paid on total time deposits of less than $100,000 / Total time deposits that are less than $100,000	FR Y9-C
Int. Exp. Time Deposits>100k	Interest expense paid on total time deposits of more than $100,000 / Total time deposits that are more than $100,000	FR Y9-C
Total Int. Exp.	Total interest expense / Total liabilities	FR Y9-C
σStock Rets.	Standard deviation of the daily stock returns of the BHC's stock over the year	FR Y9-C
σROA	Log (Rolling standard deviation of ROA of the BHC for the ahead 8 quarters)	FR Y9-C
ΔLoans	(Log Total Nominal Loans – Lag Log Total Nominal Loans)/ (Lag Log Total Nominal Loans)	FR Y9-C
ΔBad Loans	(Log Total Nominal Bad Loans – Lag Log Total Nominal Bad Loans) / (Lag Log Total Nominal Bad Loans)	FR Y9-C

ΔRWA	(Log Total Nominal Risk Weighted Assets – Lag Log Total Nominal Risk Weighted Assets) / (Lag Log Total Nominal Risk Weighted Assets)	FR Y9-C
ΔNI Income	(Log Total Nominal Non-Interest Income – Lag Log Total Nominal Non-Interest Income) / (Lag Log Total Nominal Non-Interest Income)	FR Y9-C
Financial Variables (used and described in Appendix B)		
σ_E	Standard deviation of the monthly returns on the BHC's stock over the year (annualized)	CRSP
E	Number of shares outstanding times the share price on the last day of the trading year	CRSP, FR Y9-C
B	Book value of Total Liabilities	FR Y9-C
V	Market value of Total Assets	CRSP, FR Y9-C
Board Variables		
Board Size	Total number of directors on the board of the bank	BoardEx
Board Independence	Total number of directors that are classified as independent / Board Size	BoardEx
Board Female%	Total number of directors that are female / Board Size	BoardEx
Board Age	Total age of directors of the board / Board Size	BoardEx
Board Fin. Experts%	Total number of independent directors that have prior experience working as a CFO or finance director / Board Size	BoardEx
Board Avg. Quals.	Total number of qualifications held by directors of the board / Board Size	BoardEx
Board Avg. Seats	Total number of board seats currently held in public and private firms by directors of the board / Board Size	BoardEx
CEO Tenure	Total number of years the CEO has served in this position	BoardEx
CEO Duality	Dummy variable that is = 1 if the CEO is also the Chairman of the board and 0 if otherwise	BoardEx
CEO MBA	Dummy variable that is = 1 if the CEO has an MBA and 0 if otherwise	BoardEx
CEO Ivy League UG	Dummy variable that is = 1 if the CEO obtains an undergraduate degree from an Ivy League institution and 0 if otherwise	BoardEx
CEO Overconfidence	Dummy variable that is = 1 if the CEO holds exercisable stock options that are at least 67% in the money and 0 if otherwise	ExecuComp
CEO Depression Baby	Dummy variable that is = 1 if the CEO is born between 1920 and 1929 and 0 if otherwise	BoardEx
CEO Career Crisis Starter	Dummy variable that is = 1 if the CEO starts her career (assuming age of 22) during a crisis (as defined by the NBER crisis database) and 0 if otherwise	BoardEx, NBER crisis database
CEO Age	Log (1+ Age of the CEO)	BoardEx
CEO Log(Salary)	Log (1+ CEO Salary). Salary is expressed in thousands	ExecuComp
CEO Log(Vega)	Log (1+ Vega). Vega is the sensitivity of CEO compensation to stock return volatility, expressed in thousands	ExecuComp
CEO Log(Delta)	Log (1+ Delta). Vega is the sensitivity of CEO compensation to share price, expressed in thousands	ExecuComp
County Variables		
County Religiosity	Number of religious adherents (interpolated using 2000 and 2010 survey) / county population	ARDA
County Unemployment%	County unemployment rate (%)	BLS
County Income per Cap.	Average county income per capita	BEA
County HHI	HHI of deposits (calculated as the summation of deposit^2) in the county	FDIC Summary of Deposits
Other Variables		
Reg by Fed (FDIC, OCC)	Dummy variable that is = 1 if the main bank subsidiary (as defined by proportion of total assets) under the BHC is regulated by the Fed (FDIC, OCC) and 0 if otherwise	Commercial Bank Call Report
$CPP_{08\text{-}13}$	Dummy variable that is = 1 if the BHC receives Capital Purchase Program bailout funds and 0 if otherwise for years after 2008	Center for Responsive Politics
$\text{Post-Crisis}_{08\text{-}13}$	Dummy variable that is = 1 for years 2008 to 2013 and 0 if otherwise	FR Y9-C

Appendix B
Estimation of σ_V, *V* and *IPP*

We follow Ronn and Verma (1986), Duan et al. (1992) and Bushman and Williams (2012) in estimating the two unobservables σ_V and V required as inputs to compute the insurance premium percentage (*IPP*). We obtain values for both σ_V (volatility of asset returns) and V (market value of assets) by solving an iterative process of two non-linear equations based on the Black-Scholes-Merton option pricing model.

The first Equation (A1) models the market value of a bank's equity as a call option on the unobservable market value of a bank's total assets:

$$E = VN(X) - pBN(X - \sigma_V\sqrt{T}) \tag{A1}$$

$$\text{where } X = (\ln(V/pB) + \sigma^2{}_V T/2)/(\sigma_V\sqrt{T}) \tag{A2}$$

where E is the market value of equity, B is the book value of liabilities, T is the time to maturity of the option and is set to one on the assumption that the next audit occurs in one year when the option is re-priced following changes in financial parameters, $N()$ is the cumulative density of a standard normal variable, and p is a regulatory forbearance parameter introduced by Ronn and Verma (1986) that accounts for regulatory delays in exercising the option due to dissolution costs. p is set to 0.97 following previous research (Ronn and Verma, 1986; Hovakimian et al., 2003; Bushman and Williams, 2012) which allows the asset value of a bank to deteriorate to 97% of debt before the option is exercised.

Using Ito's lemma, it can be shown that:

$$\sigma_E = (VN(X)\sigma_V)/(E) \tag{A3}$$

where σ_E is the standard deviation of the monthly returns on the bank's stock (annualized by multiplying by $\sqrt{12}$). Equation (A3) is the optimal hedge equation that relates the volatility of bank equity returns to bank asset returns. A Newton search algorithm obtains annual estimates of σ_V and V by simultaneously solving Equations (A1) and (A3) in an iterative process.

After obtaining estimates of σ_V and V, we are then able to compute the fair value of IPP, derived by Merton (1977).

$$IPP = N(y + \sigma_V\sqrt{T}) - (1 - \delta)^n(V/B)N(y) \tag{A4}$$

$$\text{where } y = ((\ln(B/V(1 - \delta)^n) - (\sigma^2{}_V T/2))/(\sigma_V\sqrt{T}) \tag{A5}$$

where δ is the dividend per dollar of market value of assets, and n is the number of times per period the dividend is paid per annum. Dividends are included in the *IPP* valuation equation since the writer of the put option, the FDIC, is not dividend-protected.

Internet Appendix

Is the Fox Guarding the Henhouse?
Bankers in the Federal Reserve, Bank Leverage and Risk-shifting

Ivan Lim*, Jens Hagendorff, Seth Armitage

This appendix contains information and tabulated results of additional tests from:
Is the Fox Guarding the Henhouse?
Bankers in the Federal Reserve, Bank Leverage and Risk-shifting

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Table IA.1
Robustness Tests: Current Fed

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_V at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2$*Current Fed Gain (Loss)*$_{i,t}$ x $\sigma_{Vi,t} + \alpha_3$*Current Fed Gain (Loss)*$_{i,t}$ + *Bank Controls*$_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V*) is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Current Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board that is currently serving in public service positions at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Current Fed Gain (Loss)*$_{i,t}$ x $\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1) B/V	(2) B/V	(3) B/V	(4) B/V	(5) B/V	(6) B/V	(7) IPP	(8) IPP	(9) IPP	(10) IPP	(11) IPP	(12) IPP
Current Fed Gain x σ_v	1.204***	0.950***	1.160***				0.465***	0.406***	0.462***			
	[3.653]	[4.244]	[3.785]				[4.669]	[4.424]	[4.774]			
Current Fed Loss x σ_v				0.13	-0.058	0.168				0.054	-0.04	0.056
				[0.491]	[-0.263]	[0.639]				[0.637]	[-0.409]	[0.645]
σ_v	-12.275***	-8.530**	-14.491***	-14.095***	-10.081***	-16.411***	-1.132	-1.338	-1.346	-1.899	-1.983	-2.126
	[-2.717]	[-2.450]	[-3.150]	[-3.219]	[-2.825]	[-3.746]	[-0.736]	[-0.822]	[-0.859]	[-1.301]	[-1.207]	[-1.427]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.732	0.767	0.739	0.723	0.757	0.73	0.747	0.764	0.749	0.705	0.732	0.707
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table IA.2
Robustness Tests: Fed Directorship

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_V at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2$*Fed Directorship Gain (Loss)*$_{i,t} \times \sigma_{Vi,t} + \alpha_3$*Fed Directorship Gain (Loss)*$_{i,t}$ + *Bank Controls*$_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V*) is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Directorship Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with Reserve Bank Directorship experience at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Fed Directorship Gain (Loss)*$_{i,t} \times \sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1) B/V	(2) B/V	(3) B/V	(4) B/V	(5) B/V	(6) B/V	(7) IPP	(8) IPP	(9) IPP	(10) IPP	(11) IPP	(12) IPP
Fed Directorship Gain x σ_v	0.264	0.173	0.299				0.156**	0.183***	0.161**			
	[1.088]	[1.048]	[1.360]				[2.393]	[2.699]	[2.549]			
Fed Directorship Loss x σ_v				-0.694**	-0.658***	-0.701**				-0.228***	-0.308***	-0.225***
				[-2.332]	[-3.104]	[-2.339]				[-2.861]	[-3.556]	[-2.856]
σ_v	-14.238***	-10.533***	-16.532***	-12.866***	-9.551***	-15.028***	-2.035	-2.446	-2.265	-1.428	-1.754	-1.65
	[-3.314]	[-3.006]	[-3.771]	[-3.075]	[-2.872]	[-3.482]	[-1.390]	[-1.544]	[-1.510]	[-1.012]	[-1.184]	[-1.131]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.723	0.757	0.731	0.724	0.758	0.732	0.707	0.737	0.71	0.707	0.736	0.709
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table IA.3
Robustness Tests: Fed Advisory

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_V at Fed connected banks. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2$*Fed Advisory Gain (Loss)*$_{i,t}$ x $\sigma_{Vi,t}$ + α_3*Fed Advisory Gain (Loss)*$_{i,t}$ + *Bank Controls*$_{i,t}$ + $\varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V*) is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Advisory Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with Federal Reserve Advisory Council experience at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital*, *Bad Loans*, *ROA*, *Total Deposits*, *Log Total Assets*, *Log Total Assets Sq*, *Total Loans*, *Board Size*, *Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Fed Advisory Gain (Loss)*$_{i,t}$ x $\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Advisory Gain x σ_v	1.335***	1.031***	1.273***				0.514***	0.453***	0.512***			
	[5.166]	[5.442]	[5.161]				[7.061]	[6.229]	[7.166]			
Fed Advisory Loss x σ_v				-1.008***	-1.359***	-1.024***				-0.220**	-0.440***	-0.218**
				[-4.741]	[-11.008]	[-4.868]				[-2.207]	[-8.490]	[-2.206]
σ_v	-12.320***	-8.532**	-14.511***	-14.995***	-11.664***	-17.184***	-1.148	-1.32	-1.346	-1.98	-2.526	-2.194
	[-2.740]	[-2.466]	[-3.175]	[-3.333]	[-3.371]	[-3.721]	[-0.748]	[-0.814]	[-0.861]	[-1.259]	[-1.536]	[-1.362]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.734	0.768	0.74	0.726	0.765	0.733	0.754	0.77	0.755	0.709	0.747	0.711
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table IA.4
Robustness Tests: Controlling for Other Connections

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_V at Fed connected banks while controlling for other forms of influence. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2 \textit{Fed Gain (Loss)}_{i,t} \times \sigma_{Vi,t} + \alpha_3 \textit{Fed Gain (Loss)}_{i,t} + \textit{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. We further include *Ex-Regulator Gain (Loss)*, defined as a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with non-public service experience at any regulatory agency and 0 if otherwise and interact it with σ_v, *Politician Gain (Loss)*, defined as a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board who were politicians and 0 if otherwise. A politician is defined as having been Congressman (US Senators and US House Representatives), Deputy Secretary/Secretary of US Departments, US State Lieutenant Governors/Governors or US City Mayors) We also include *Lobby%*, defined as (Amount spent on lobbying / Total Assets) in %. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 ($\textit{Fed Gain (Loss)}_{i,t} \times \sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x σ_v	0.951**	0.611**	0.899**				0.374***	0.303***	0.372***			
	[2.365]	[2.023]	[2.335]				[2.852]	[2.712]	[2.873]			
Fed Loss x σ_v				-0.828***	-1.046***	-0.834***				-0.223***	-0.399***	-0.221***
				[-4.015]	[-6.311]	[-4.175]				[-2.957]	[-6.539]	[-2.949]
Ex-Regulator Gain x σ_v	-0.257	-0.043	-0.226				-0.08	-0.009	-0.08			
	[-0.654]	[-0.147]	[-0.589]				[-0.546]	[-0.067]	[-0.547]			
Politician Gain x σ_v	-0.281	-0.173	-0.351				-0.05	-0.053	-0.052			
	[-0.891]	[-0.803]	[-1.144]				[-1.015]	[-1.017]	[-1.134]			
Ex-Regulator Loss x σ_v				-0.851**	-0.056	-0.721*				-0.247***	-0.200***	-0.235***
				[-2.147]	[-0.225]	[-1.769]				[-3.884]	[-2.850]	[-3.925]
Politician Loss x σ_v				0.239	0.272**	0.183				0	0.044	-0.003
				[0.902]	[2.374]	[0.741]				[-0.004]	[1.326]	[-0.072]
Lobby% x σ_v	-24.195	15.884	-25.279	-37.075	18.735	-38.092	-1.223	-20.132	0.542	-5.765	-18.722	-4.046
	[-0.254]	[0.263]	[-0.260]	[-0.375]	[0.287]	[-0.379]	[-0.104]	[-1.317]	[0.053]	[-0.583]	[-1.540]	[-0.449]
σ_v	-11.259**	-8.663**	-13.588***	-13.975***	-10.501***	-16.084***	-0.849	-1.222	-1.051	-1.718	-2.075	-1.928
	[-2.219]	[-2.371]	[-2.666]	[-3.354]	[-3.344]	[-3.751]	[-0.504]	[-0.728]	[-0.611]	[-1.228]	[-1.518]	[-1.339]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.731	0.763	0.737	0.726	0.764	0.733	0.742	0.762	0.744	0.711	0.752	0.713
Observations	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539	2,539

Table IA.5
Robustness Test: Controlling for Creditor Discipline

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_v at Fed connected banks while controlling for depositor discipline. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2 \textit{Fed Gain (Loss)}_{i,t} \, x \, \sigma_{Vi,t} + \alpha_3 \textit{Fed Gain (Loss)}_{i,t} + \textit{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V*) is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. We further include *Core Deposits*, defined as (Core Deposits / Total Assets) and *Sub Debt*, defined as (Book value of Subordinated debt / (Subordinated debt + Tier-1 Capital)) and interact it with σ_v. *Bank Controls* include: *Tier-1 Capital*, *Bad Loans*, *ROA*, *Total Deposits*, *Log Total Assets*, *Log Total Assets Sq*, *Total Loans*, *Board Size*, *Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Fed Gain (Loss)*$_{i,t}$ *x* $\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1) B/V	(2) B/V	(3) B/V	(4) B/V	(5) B/V	(6) B/V	(7) IPP	(8) IPP	(9) IPP	(10) IPP	(11) IPP	(12) IPP
Fed Gain x σ_v	1.065***	0.734***	1.026***				0.384***	0.336***	0.381***			
	[3.130]	[2.996]	[3.172]				[3.352]	[3.650]	[3.360]			
Fed Loss x σ_v				-0.847***	-0.993***	-0.848***				-0.222***	-0.400***	-0.217***
				[-4.562]	[-6.592]	[-4.601]				[-3.037]	[-6.598]	[-2.982]
Core Deposits x σ_v	-1.500***	-1.336***	-1.498***	-0.798	-0.612	-0.816*	-0.274**	-0.339**	-0.272**	-0.022	-0.015	-0.022
	[-3.270]	[-3.378]	[-3.373]	[-1.610]	[-1.473]	[-1.704]	[-2.082]	[-2.201]	[-2.069]	[-0.141]	[-0.098]	[-0.138]
Sub Debt x σ_v	-0.431	0.963	-0.415	-0.497	0.829	-0.494	0.102	0.094	0.131	0.096	0.039	0.126
	[-0.588]	[1.414]	[-0.594]	[-0.613]	[1.077]	[-0.643]	[0.473]	[0.410]	[0.603]	[0.404]	[0.148]	[0.528]
σ_v	-13.504***	-9.795***	-15.479***	-15.183***	-10.967***	-17.166***	-1.217	-1.529	-1.4	-1.806	-2.074	-2.007
	[-3.130]	[-3.088]	[-3.517]	[-4.120]	[-3.783]	[-4.585]	[-0.785]	[-0.999]	[-0.881]	[-1.318]	[-1.579]	[-1.422]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.744	0.775	0.749	0.736	0.772	0.742	0.748	0.769	0.75	0.713	0.753	0.715
Observations	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487

Table IA.6
Robustness Test: Controlling for Additional Board Characteristics

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_v at Fed connected banks while controlling for additional board characteristics. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2 \textit{Fed Gain (Loss)}_{i,t} \, x \, \sigma_{Vi,t} + \alpha_3 \textit{Fed Gain (Loss)}_{i,t} + \textit{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. We further include *Board Female%*, defined as (Total number of directors that are female / Board Size), *Board Age*, defined as (Total age of directors of the board / Board Size), *Board Fin. Experts%*, defined as (Total number of independent directors that have prior experience working as a CFO or finance director / Board Size) and *Board Avg. Quals.*, defined as (Total number of qualifications held by directors of the board / Board Size), *Board Avg. Seats*, defined as (Total number of board seats currently held in public and private firms by directors of the board / Board Size) and interact it with σ_v. *Bank Controls* include: *Tier-1 Capital*, *Bad Loans*, *ROA*, *Total Deposits*, *Log Total Assets*, *Log Total Assets Sq*, *Total Loans*, *Board Size*, *Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 ($\textit{Fed Gain (Loss)}_{i,t} \, x \, \sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x σ_v	0.878***	0.585**	0.843***				0.347***	0.292***	0.344***			
	[2.666]	[2.495]	[2.713]				[3.177]	[3.383]	[3.208]			
Fed Loss x σ_v				-0.802***	-0.981***	-0.818***				-0.219***	-0.385***	-0.216***
				[-3.842]	[-6.259]	[-4.053]				[-2.964]	[-6.452]	[-2.942]
Board Female% x σ_v	1.063	0.717	1.147	0.68	0.401	0.787	0.057	-0.024	0.047	-0.092	-0.179	-0.1
	[1.361]	[1.494]	[1.532]	[0.816]	[0.777]	[0.991]	[0.383]	[-0.137]	[0.320]	[-0.454]	[-0.916]	[-0.500]
Board Age x σ_v	0	0.004	-0.002	-0.001	0.004	-0.002	0	0.001	0	0	0.001	0
	[-0.086]	[1.001]	[-0.306]	[-0.163]	[1.052]	[-0.413]	[-0.196]	[0.571]	[-0.269]	[-0.137]	[0.717]	[-0.217]
Board Fin. Experts% x σ_v	-0.115	-0.096	-0.11	-0.083	-0.055	-0.076	-0.026	-0.032	-0.027	-0.021	-0.019	-0.022
	[-1.110]	[-1.017]	[-1.108]	[-0.898]	[-0.957]	[-0.886]	[-0.863]	[-0.825]	[-0.901]	[-0.790]	[-0.794]	[-0.841]
Board Avg. Quals. x σ_v	0.09	0.043	0.083	0.071	-0.007	0.063	0.028	0.032	0.028	0.02	0.01	0.021
	[0.488]	[0.354]	[0.474]	[0.377]	[-0.061]	[0.350]	[0.659]	[0.697]	[0.682]	[0.480]	[0.232]	[0.496]
Board Avg. Seats x σ_v	0.177*	0.056	0.172*	0.211**	0.088	0.207**	0.045	0.03	0.045	0.056*	0.044	0.056*
	[1.684]	[0.739]	[1.708]	[2.100]	[1.366]	[2.158]	[1.388]	[0.918]	[1.406]	[1.818]	[1.592]	[1.838]
σ_v	-9.084*	-7.446**	-11.405**	-10.852**	-9.230***	-13.169***	-0.389	-0.682	-0.572	-1.108	-1.591	-1.313
	[-1.760]	[-1.976]	[-2.175]	[-2.477]	[-3.043]	[-3.010]	[-0.240]	[-0.399]	[-0.342]	[-0.815]	[-1.212]	[-0.932]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.737	0.766	0.744	0.732	0.766	0.74	0.748	0.767	0.75	0.718	0.757	0.72
Observations	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532

Table IA.7
Robustness Test: Controlling for Additional CEO Characteristics

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_v at Fed connected banks while controlling for additional CEO characteristics. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2$*Fed Gain (Loss)*$_{i,t}$ x $\sigma_{Vi,t} + \alpha_3$*Fed Gain (Loss)*$_{i,t}$ + *Bank Controls*$_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. We further include *CEO MBA*, defined as (a dummy that = 1 if a CEO has an MBA and 0 if otherwise), *CEO Ivy League UG*, defined as (a dummy that = 1 if the CEO obtains an undergraduate degree from an Ivy League institution and 0 if otherwise), *CEO Overconfidence*, defined as (a dummy variable that = 1 if the CEO holds exercisable stock options that are at least 67% in the money and 0 if otherwise), *CEO Depression Baby*, defined as (a dummy variable that = 1 if the CEO is born between 1920 and 1929 and 0 if otherwise), *CEO Crisis Career Started*, defined as (a dummy variable that = 1 if the CEO starts her career (assuming age of 22) during a crisis (as defined by the NBER crisis database) and 0 if otherwise), *CEO Age*, defined as (Log (1+Age of the CEO)), *CEO Log(Salary*), defined as (Log (1+ CEO Salary)), *CEO Log(Vega)*, defined as (Log (1+Vega)), and *CEO Log(Delta)*, defined as (Log (1+Delta)) and interact it with σ_v. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Fed Gain (Loss)*$_{i,t}$ x $\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x σ_v	-0.036	0.124	-0.02				0.190**	0.229***	0.192**			
	[-0.141]	[0.650]	[-0.075]				[2.181]	[2.917]	[2.216]			
Fed Loss x σ_v				-1.001***	-0.847***	-0.995***				-0.357***	-0.357***	-0.366***
				[-3.555]	[-4.070]	[-3.476]				[-4.399]	[-4.676]	[-4.519]
CEO MBA x σ_v	0.185	0.211	0.214	0.335	0.267	0.357	-0.034	0.024	-0.03	-0.004	0.026	-0.003
	[0.859]	[1.070]	[0.971]	[1.541]	[1.561]	[1.568]	[-0.491]	[0.324]	[-0.444]	[-0.063]	[0.350]	[-0.052]
CEO Ivy League UG x σ_v	0.489*	0.355**	0.544*	0.364	0.265	0.405	0.182**	0.151*	0.189**	0.13	0.102	0.13
	[1.725]	[2.071]	[1.734]	[1.274]	[1.491]	[1.279]	[2.150]	[1.883]	[2.198]	[1.532]	[1.179]	[1.508]
CEO Overconfidence x σ_v	-0.631*	-0.454*	-0.638*	-0.434	-0.303	-0.447	-0.008	0.024	-0.016	0.063	0.086	0.055
	[-1.914]	[-1.797]	[-1.874]	[-1.399]	[-1.353]	[-1.380]	[-0.139]	[0.428]	[-0.284]	[1.421]	[1.652]	[1.254]
CEO Depression Baby x σ_v	1.767***	0.516	1.931***	1.836***	0.584	2.030***	-0.16	-0.243*	-0.187	-0.082	-0.137	-0.091
	[2.832]	[1.090]	[2.695]	[4.098]	[1.521]	[3.713]	[-1.024]	[-1.728]	[-1.180]	[-0.930]	[-1.423]	[-0.965]
CEO Crisis Career Starter x σ_v	0.191	0.128	0.264	0.097	0.058	0.18	-0.058	-0.094*	-0.06	-0.032	-0.055	-0.033
	[1.022]	[1.057]	[1.423]	[0.542]	[0.590]	[0.995]	[-1.203]	[-1.811]	[-1.281]	[-0.719]	[-1.123]	[-0.748]
CEO Age x σ_v	-0.015	0.01	-0.018	-0.027*	0.002	-0.029*	0.003	0.004	0.003	-0.001	-0.001	-0.001
	[-0.791]	[0.855]	[-0.929]	[-1.820]	[0.259]	[-1.944]	[0.563]	[0.652]	[0.546]	[-0.166]	[-0.141]	[-0.144]
CEO Log(Salary) x σ_v	0.079	-0.171	0.044	0.286	0.01	0.255	-0.053	-0.073	-0.05	0.037	0.027	0.043
	[0.359]	[-1.093]	[0.208]	[1.427]	[0.074]	[1.239]	[-0.953]	[-1.358]	[-0.904]	[0.753]	[0.513]	[0.864]
CEO Log(Vega) x σ_v	0.086	0.131	0.105	0.07	0.111	0.089	0.032	0.042	0.028	0.012	0.017	0.007
	[0.695]	[1.661]	[0.853]	[0.634]	[1.656]	[0.797]	[0.941]	[1.168]	[0.815]	[0.404]	[0.500]	[0.234]
CEO Log(Delta) x σ_v	-0.173	-0.098	-0.17	-0.187*	-0.103*	-0.181	-0.041	-0.058*	-0.042	-0.060***	-0.072***	-0.060**
	[-1.453]	[-1.447]	[-1.368]	[-1.779]	[-1.760]	[-1.624]	[-1.332]	[-1.951]	[-1.372]	[-2.795]	[-3.043]	[-2.602]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
σ_v	-4.747	-1.611	-4.008	-2.855	-0.734	-2.47	-2.126	-0.951	-2.078	-2.279	-0.841	-2.433
	[-0.520]	[-0.215]	[-0.446]	[-0.334]	[-0.115]	[-0.291]	[-0.960]	[-0.424]	[-0.844]	[-1.159]	[-0.395]	[-1.126]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.775	0.879	0.78	0.787	0.89	0.792	0.847	0.859	0.847	0.867	0.874	0.868
Observations	516	516	516	516	516	516	516	516	516	516	516	516

Table IA.8

Robustness Test: Controlling for County Characteristics

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_v at Fed connected banks while controlling for depositor discipline. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2$*Fed Gain (Loss)*$_{i,t}\, x\, \sigma_{Vi,t} + \alpha_3$*Fed Gain (Loss)*$_{i,t}$ + *Bank Controls*$_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V*) is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. We further include *County Religiosity*, defined as (Number of religious adherents / county population), *County Unemployment%*, defined as (County unemployment rate in %), *County Income per Cap.*, defined as (Average county income per capita) and *County HHI*, defined as (HHI of deposits in the county) and interact it with σ_v. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Fed Gain (Loss)*$_{i,t}\, x\, \sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x σ_v	0.931***	0.720***	0.894***				0.363***	0.311***	0.359***			
	[3.065]	[3.511]	[3.059]				[3.590]	[4.106]	[3.604]			
Fed Loss x σ_v				-0.782***	-1.051***	-0.776***				-0.234***	-0.402***	-0.229***
				[-3.512]	[-8.301]	[-3.628]				[-2.763]	[-5.991]	[-2.718]
County Religiosity x σ_v	-0.013	-0.001	-0.009	-0.032	-0.016	-0.028	-0.003	-0.003	-0.003	-0.011	-0.009	-0.01
	[-0.630]	[-0.103]	[-0.450]	[-1.461]	[-0.970]	[-1.281]	[-0.666]	[-0.593]	[-0.536]	[-1.611]	[-1.598]	[-1.524]
County Unemployment% x σ_v	0.103***	0.083***	0.100***	0.080***	0.056***	0.078***	0.022***	0.028***	0.022***	0.013*	0.016**	0.013*
	[4.640]	[4.374]	[4.616]	[3.678]	[3.077]	[3.675]	[3.172]	[3.888]	[3.162]	[1.892]	[2.458]	[1.860]
County Income per Cap. x σ_v	0.009	0.009**	0.009	0.001	0.002	0.001	0.001	0.001	0.001	-0.002	-0.002	-0.002
	[1.365]	[2.226]	[1.481]	[0.083]	[0.337]	[0.141]	[0.706]	[0.603]	[0.622]	[-0.927]	[-1.159]	[-0.969]
County HHI x σ_v	0	0	0	0	0	0	0	0	0	0	0	0
	[-0.271]	[0.730]	[-0.342]	[-0.428]	[0.835]	[-0.489]	[0.003]	[0.317]	[-0.069]	[-0.248]	[0.401]	[-0.313]
σ_v	-13.221***	-4.632	-15.152***	-14.989***	-6.562**	-16.890***	-0.554	-0.411	-0.678	-1.232	-1.229	-1.365
	[-2.724]	[-1.299]	[-3.103]	[-3.688]	[-2.355]	[-4.134]	[-0.331]	[-0.248]	[-0.399]	[-0.869]	[-0.976]	[-0.948]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.764	0.797	0.768	0.759	0.797	0.764	0.775	0.804	0.776	0.747	0.797	0.748
Observations	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890

Table IA.9
Robustness Tests: Exclude Crisis Years

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_v at Fed connected banks when excluding crisis years 2007-2008. The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2 \textit{Fed Gain (Loss)}_{i,t} \, x \, \sigma_{Vi,t} + \alpha_3 \textit{Fed Gain (Loss)}_{i,t} + \textit{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital*, *Bad Loans*, *ROA*, *Total Deposits*, *Log Total Assets*, *Log Total Assets Sq*, *Total Loans*, *Board Size*, *Board Independence*, *CEO Tenure*, *CEO Duality*, *Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 ($\textit{Fed Gain (Loss)}_{i,t} \, x \, \sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1) B/V	(2) B/V	(3) B/V	(4) B/V	(5) B/V	(6) B/V	(7) IPP	(8) IPP	(9) IPP	(10) IPP	(11) IPP	(12) IPP
Fed Gain x σ_v	0.846***	0.541***	0.801***				0.336***	0.282***	0.332***			
	[3.025]	[3.134]	[3.021]				[3.643]	[3.889]	[3.629]			
Fed Loss x σ_v				-0.628***	-0.667***	-0.655***				-0.200***	-0.368***	-0.202***
				[-2.955]	[-4.376]	[-3.211]				[-3.021]	[-6.264]	[-3.077]
σ_v	-12.363**	-10.156***	-13.914***	-14.564***	-11.983***	-16.136***	-1.077	-1.493	-1.275	-1.929	-2.445*	-2.16
	[-2.511]	[-2.962]	[-2.753]	[-3.805]	[-4.342]	[-4.084]	[-0.652]	[-0.863]	[-0.759]	[-1.508]	[-1.902]	[-1.645]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.755	0.802	0.761	0.749	0.799	0.756	0.777	0.805	0.779	0.745	0.79	0.747
Observations	1,977	1,977	1,977	1,977	1,977	1,977	1,977	1,977	1,977	1,977	1,977	1,977

Table IA.10
Robustness Tests: Exclude Worst Performing Banks

This table reports estimates of Equation (5) and (6) using panel OLS regressions (with different specifications) and examines the sensitivity of leverage (*B/V* in Columns (1)-(6)) and the value of public subsidies (*IPP* in Columns (7)-(12)) to changes in σ_v at Fed connected banks when excluding the worst one-third of banks in a year (as measured by *ROA*). The sample period is from 2002 to 2013. We estimate the following regression: $Y_{i,t} = \alpha_0 + \alpha_1\sigma_{Vi,t} + \alpha_2 \textit{Fed Gain (Loss)}_{i,t} \, x \, \sigma_{Vi,t} + \alpha_3 \textit{Fed Gain (Loss)}_{i,t} + \textit{Bank Controls}_{i,t} + \varepsilon_{i,t}$ where *i* and *t* indexes bank and year respectively. *Y* is (*B/V*) in Columns (1)-(6) and *IPP* in Columns (7)-(12). (*B/V)* is the book value of leverage divided by market value of assets, *IPP* is the value of public subsidies per dollar of debt, σ_v is asset volatility and *Fed Gain (Loss)* is a dummy variable that is = 1 if there is an increase (decrease) in the number of directors of the BHC board with public service experience at the Federal Reserve and 0 if otherwise. *Bank Controls* include: *Tier-1 Capital, Bad Loans, ROA, Total Deposits, Log Total Assets, Log Total Assets Sq, Total Loans, Board Size, Board Independence, CEO Tenure, CEO Duality, Market Risk* and the interaction of these variables with σ_v. Refer to Appendix A for description of variables and Appendix B for the construction of (*B/V*), *IPP* and σ_v. Our variable of interest is the coefficient on the interaction term α_2 (*Fed Gain (Loss)*$_{i,t}$ *x* $\sigma_{Vi,t}$). Standard errors are clustered at the bank-level and t-statistics are reported in parenthesis. We do not report the constant for brevity. ***, ** and * indicate significance levels at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	B/V	B/V	B/V	B/V	B/V	B/V	IPP	IPP	IPP	IPP	IPP	IPP
Fed Gain x σ_v	0.998***	0.712***	0.948***				0.393***	0.366***	0.387***			
	[4.227]	[4.297]	[4.239]				[4.993]	[6.344]	[4.999]			
Fed Loss x σ_v				-0.054	-0.545***	-0.101				-0.111	-0.271***	-0.113
				[-0.125]	[-2.620]	[-0.235]				[-1.301]	[-4.634]	[-1.333]
σ_v	-10.731**	-6.184*	-12.472***	-15.280***	-9.703***	-16.888***	-1.797	-0.951	-1.974	-3.501**	-2.750***	-3.700***
	[-2.351]	[-1.693]	[-2.673]	[-3.582]	[-3.120]	[-3.888]	[-1.325]	[-0.835]	[-1.423]	[-2.540]	[-2.648]	[-2.637]
Bank Controls x σ_v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regulator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Ventile-Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.746	0.732	0.753	0.733	0.719	0.741	0.817	0.865	0.82	0.727	0.799	0.732
Observations	1,735	1,735	1,735	1,735	1,735	1,735	1,735	1,735	1,735	1,735	1,735	1,735