Too close for comfort?
Regulatory connections and public subsidies to banks

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Abstract

Nearly one in three US public banks employ at least one board member who is either an ex-bank regulator or a (former) advisor to a bank regulator. In this paper, we investigate whether these regulatory connections affect the public subsides afforded to banks. We find that banks with a higher proportion of connected board members are able to extract larger public subsidies by increasing asset risk and leverage. Further, shareholders of connected banks benefit from higher returns and an increased probability of payouts. Therefore, connections undermine regulatory effectiveness and transfer wealth from taxpayers to the shareholders of connected banks. We argue that our results are driven by connections causing regulators to be biased rather than by quid-pro-quo arrangements between regulators and bankers or by the technical expertise of connected bankers.

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1. Introduction

Taxpayers have a history of subsidizing the risk-taking activities of banking institutions. The negative externalities associated with bank failures have led to the creation of a financial safety-net that effectively shields many bank creditors from loss. During crisis episodes in particular, banks have access to generous safety-net subsidies, ranging from deposit insurance and liquidity assistance to taxpayer-funded capital assistance. During the 2008-09 crisis alone, hundreds of billions in taxpayers' funds were used to stabilize the financial sector. The moral hazard effects caused by the financial safety-net and other government guarantees are a pervasive issue (Bhattacharya, Boot and Thakor, 1998; Hovakimian and Kane, 2000; Demirgüç-Kunt and Huizinga, 2004; Duchin and Sosyura, 2012; 2014). A key role of financial regulators is to safeguard taxpayer interests and prevent banks from exploiting their access to safety-net subsidies.

There are increasing concerns that regulators and the financial sector have grown too close and that this undermines the effectiveness of financial regulation.[1] In this study, we focus on personal connections between the members of the board of public bank holding companies (BHCs) and federal or state banking regulators to examine if connections undermine bank supervision and expose taxpayers to higher losses. Whether or not connected banks receive larger safety-net subsidies is an important question that previous evidence does not address: Previous studies link regulatory connections to how active regulators are in terms of issuing enforcement actions (Lucca, Seru and Trebbi, 2014; Shive and Forster, 2014) but not to how effective regulators are in terms safeguarding taxpayer interests. In this paper, we provide systematic evidence that connections

[1] See 'Senate Panel to Hold Hearing on Regulators' Ties With Banks' *Wall Street Journal*, 31 October 2014. 'N.Y. Fed Staff Still Too Cozy With Banks', Wall Street Journal, 21 November 2014. 'Fed Asks Whether It Is Too Close To Banks', *Financial Times*, 20 November 2014.

undermine regulatory effectiveness in a way that subsidizes bank shareholders at the expense of safety-net guarantors.

Our study identifies connections between the members of the board of directors of a bank and various bank regulatory agencies. Regulatory agencies include the Federal Reserve (Fed), the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), the Office of Thrift Supervision (OTS), the U.S. Securities and Exchange Commission (SEC) and State level banking regulators.

We collect detailed CV data to identify two types of connections between board members and bank regulators. First, banks are connected if directors have at some point in their career worked full-time in a regulatory agency before joining a bank board. We refer to these as *revolving door appointments*. An example of a revolving door appointment is Michael Moskow who joined the board of Taylor Capital in 2007 after leaving the Fed Federal Reserve Bank of Chicago where he has been President since 1994. Second, banks are connected if directors are presently serving or have previously served on an advisory council to a regulatory body. We call these directors *public service advisors*. For example, Jamie Dimon served as a Class A director of the Board of Directors of the Federal Reserve Bank of New York from 2007 to 2012 while he was CEO of JPMorgan Chase. Based on these two types of connections, around one third of bank-year observations in our sample have at least one director with regulatory connections on the board. The majority of these connections are established while directors serve in public service positions (86%) as compared to revolving door appointments (14%).

To quantify public subsidies, we exploit Merton's (1977) characterization of deposit insurance as a put option underwritten by taxpayers and a methodology developed by Duan, Moreau and Sealey (1992) and Hovakimian and Kane (2000). Under this framework, risk-shifting to the financial safety-net materializes when banks are able to underpay for the insurance offered to them commensurate with their asset risk. We empirically investigate if connected banks are able to shift risk to the safety-net by holding less capital as their asset risk increases. If so, taxpayers would subsidize bank risk-taking and be exposed to higher losses when banks fail.

We motivate our analysis with two competing hypotheses. On the one hand, banks with regulatory connections may receive preferential treatment and gain access to larger safety-net subsidies. Stigler (1971) puts forth the 'private interest view' and argues that regulators are often captured by the industry they are meant to regulate. Information asymmetry surrounding supervision grants discretionary powers to the regulator (Baron and Myerson, 1982; Tirole, 1986; Laffont and Tirole, 1993) who might not necessarily work to promote societal welfare, but instead seek to maximize their private interest. Further, regulators could derive economic private benefits in the form of lucrative post-regulatory employment in the private sector (Lucca, Seru and Trebbi, 2014) or soft psychological benefits through acceptance by and social identification with the financial industry (Barth, Caprio and Levine, 2012; Veltrop and De Haan, 2014). Consistent with the private interest view, Duchin and Sosyura (2012) find that US financial firms with political and regulatory influence are more likely to receive bailout funds during the 2008 crisis, and Duchin and Sosyura (2014) find these banks subsequently engaged in riskier activities and underperform compared to banks that are not connected.

On the other hand, connections may not undermine the regulatory process if regulators are motivated by sense of duty (Dal Bó, 2006) or social purpose (Shiller, 2012). The 'public interest view' states that, because many regulators derive intrinsic benefits from fending for the public interest (Bond and Glode, 2014), the altruistic ethos prevailing amongst regulators means that regulatory connections do not undermine regulatory effectiveness. Additionally, connections may provide important benefits to both regulators and the industry at no cost to regulatory effectiveness. Connections provide regulators with valuable information pertaining to economic conditions and industry practices (Board of Governors of the Federal Reserve, 2013) and, likewise, offer banks a privileged position to comment on and potentially shape regulatory practices that are ineffective (from a policy perspective) but costly to the industry.[2]

We begin our analysis by examining the determinants of regulatory connections. We find that more established banks, that is older and larger institutions, exhibit a higher proportion of board members with regulatory connections. Interestingly, there is no indication that connected banks are less financially sound or otherwise present a cause for regulatory concern. On the contrary, banks with more connections engage in more traditional lending business, have better quality assets (i.e. fewer bad loans) and are not riskier than banks without connections.

Next, our analysis shows evidence that regulatory connections are linked to larger safety-net subsidies. For the same level of portfolio risk, connected banks are able to hold less equity than non-connected banks and thereby shift losses to the taxpayer. Further, we find that increases in public subsidies at connected banks are positively associated with higher stock performance and an increased probability of larger payouts in the form of dividends and repurchases to shareholders. Connections, therefore, compromise regulatory oversight and transfers wealth from taxpayers to the shareholders of connected banks.

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[2] Informing regulators and policymakers on ineffective regulations as well as industry concerns are often cited as a key reason behind lobbying (e.g. Vidal, Draca and Fons-Rosen, 2012; Bertrand, Bombardini and Trebbi, 2014). These studies however show that lobbyist are valued more for their connections to politicians than their expertise, consistent with the key findings in our paper.

Our results are robust to time-invariant omitted variable bias through the use of fixed-effects, issues of self-selection using a Heckman (1979) two-step maximum likelihood estimation, different definitions of regulatory connections, a different measure of safety-net subsidies, controlling for changes in market discipline after connections have been established, connections being positive related to bank size and to differences in enforcement between regulatory agencies. Our results are also robust to endogeneity concerns of reverse causality and time-variant omitted variable bias by instrumenting for connections using bank age via a two-stage instrumental variable analysis (2SLS). Bank age is treated as an exogenous source of variation and we argue that older banks are able to establish more connections due to its visibility and reputation while not being plausibly related to its risk-adjusted deposit insurance premium. Overall, we find strong support for the private interest view of regulations.

The detailed data on regulatory connections also allows us to disentangle the reasons behind regulator's allowing banks to risk shift in the presence of connections. Notably, the data do not support two types of channels frequently cited in the literature: quid-pro-quo arrangements (where regulators are friendly with the industry to secure future employment opportunities in the industry) and knowledge transfer (where the industry acquires relevant expertise on supervision and enforcement from regulators that enables them to circumvent regulations) (Cohen, 1986; Che, 1995; Dal Bó, 2006; Lucca, Seru and Trebbi, 2014; DeHaan, Koh, Kedia and Rajgopoal, 2014; Cornaggia, Cornaggia and Xia, 2014).

First, we test if connections facilitate quid-pro-quo. Quid-pro-quo behavior is a form of corruption that cannot be directly detected in data sets (Kane, 2014). However, cross-country studies have shown that weaker institutions leave more discretion in the hands of policymakers and therefore leave more opportunities for corruption (cf. Dinç, 2005, Beck, Demirgüç-Kunt and

Levine, 2006; Barth, Lin, Lin and Song, 2009). We exploit variation in corruption and personal integrity at the level of US states to capture differences in the quality of the institutional environment for different banks. We do not find that risk-shifting is more pronounced in states with weaker institutional quality and, therefore, find no evidence for connections facilitating quid-pro-quo behavior.

Further, the idea that knowledge transfer is driving our results is not supported by two tests we run. First, we show that risk-shifting not only occurs through revolving door appointments but also when bank boards are connected via public service appointments. Since the latter does not involve input into supervision or enforcement but policy advice and linking regulators to the public (see Board of Governors of the Federal Reserve, 2013; Federal Deposit Insurance Corporation, 2015)[3] [4], it seems unlikely that knowledge transfer is the primary channel of influence.

Second and in further conflict with the idea that knowledge transfer from regulators is driving our results, we exploit differences in the charter types of the commercial banks operating under the BHC. Depending on their charter type, commercial banks could be regulated by the Fed,

[3] For instance, in the case of the Federal Reserve, advisory directors participate in the formulation of monetary policy and act as a link between regulators and the public. 'Directors are responsible for supervising the administration of the Reserve Bank's operations, overseeing the Reserve Bank's corporate governance function, and maintaining an effective system of internal auditing procedures and controls. Directors are not involved, however, in any matters related to banking supervision, including supervisory decisions' (Board of Governors of the Federal Reserve System, 2013, p.2). Specifically, 'directors may not be consulted regarding bank examination ratings, potential enforcement actions, application/approval matters, and other such supervisory matters' (pg. 41). Further, advisory directors are also excluded from yielding indirect influence via appointing regulators. They are excluded from the selection, appointment, and compensation of regulators whose main responsibilities are in the area of supervision and from any of the most senior appointments.

[4] Description of the objectives of individual advisory councils are obtained from the individual regulator's websites. See http://www.federalreserve.gov/aboutthefed/advisorydefault.htm, https://www.fdic.gov/about/index.html#2 and https://www.sec.gov/index.htm for further information.

OCC or FDIC. Crucially, the FDIC administers regulatory rules regarding deposit insurance and these rules are universal across regulators. Therefore, if risk-shifting on the back of regulatory connections was related to technical expertise, risk-shifting should be observed regardless of whether the connection exist to the responsible regulator. Put another way, if the safety-net benefits of connected banks are based on knowledge transfer, banks with Fed connections should equally be able to risk-shift when regulated by the FDIC or OCC. We first validate our test by showing that there is no difference in risk-shifting under the different federal regulators. Our results show that risk-shifting only takes place when BHCs have connections to the Fed and are being regulated by the Fed at the commercial bank level but not when regulated by the FDIC or the OCC.

Overall, our results show that banks have access to higher safety-net benefits when they are connected to regulators, irrespective of how the connections are made (via hiring of ex-regulators or through advisory appointments), but only if connections are made to the responsible regulator. This evidence of more lenient supervision for connected banks points to connections inducing a psychological bias (Barth, Caprio and Levine, 2012). It appears that connections changes the dynamics of the supervisor-supervisee relationship and undermines objective monitoring by regulators (Mills and Clark, 1982; Silver, 1990).

Our research contributes to several strands of literature. We are the first to link regulatory connections to a measure of supervisory effectiveness. Previous work has linked connections to enforcement actions as a measure of how active regulatory enforcement is (Correia, 2014; Lucca, Seru and Trebbi, 2014; Shive and Forster, 2014) but not to how effective regulators are in terms of safeguarding taxpayers from undue loss exposures. Whether or not certain banks can evade regulatory discipline is an important question.

Second, we document that connections facilitates a wealth transfer from taxpayers to shareholders. The results of previous work on connections are suggestive but not conclusive of such a wealth transfer occurring. For instance, extant studies report shareholder wealth gains linked to regulatory and political connections (Acemoglu, Johnson, Kermani, Kwak and Mitton, 2013; Adams, 2013) but do not show that connections are detrimental to the safety-net guarantors. Further, extant studies show that relative to non-connected banks, taxpayer-funded bailouts during 2008-09 in connected banks were a worse deal for taxpayers (Duchin and Sosyura, 2012; 2014). While the latter is similar to the concept of a subsidy we analyze in this paper, these studies differ from ours in that they measure political connectedness and that they focus on the 2008-09 crisis period—crisis periods are frequently characterized by heightened policy discretion and a high chance of forbearance by regulators (cf. Brown and Dinç, 2011). By contrast, we are the first to show systematic evidence of public subsidies to connected banks.

Finally, our paper contributes to studies on regulatory capture (Stigler, 1971; Peltzman, 1976 Tirole, 1986; Laffont and Tirole, 1993; Dal Bó, 2006) and capture in the financial industry (Lambert, 2014; Mian, Sufi and Trebbi, 2010; Igan, Mishra and Tressel, 2011). Mian, Sufi and Trebbi (2010) find that higher campaign contributions from the financial industry influence politicians' voting behavior regarding financial regulations. Igan, Mishra and Tressel (2011) show that lobbying by financial institutions is positively associated with risk-taking leading up to the crisis, while Lambert (2014) find that lobbying banks are less likely to be subject to severe enforcement actions. Our study contributes to this work by demonstrating that connections between bankers and regulators function as a conduit for regulatory capture alongside lobbying and campaign contributions.

2. Empirical model and hypotheses development

2.1 Modelling bank subsidies

A country's financial safety-net includes both explicit guarantees (deposit insurance, discount window lending) and implicit (bail-out) guarantees. While fundamentally important for maintaining systemic stability, the provision of these safety-net guarantees undermines market discipline and generates moral hazard (Bhattacharya, Boot and Thakor, 1998; Demirgüç-Kunt and Huizinga, 2004; Dam and Koetter, 2012).[5] Regulators are tasked with avoiding overly subsidizing bank risk-taking in the presence of these guarantees. This study investigates if banks with regulatory connections undermine regulatory effectiveness and give banks access to larger safety-net benefits.

We employ the deposit insurance pricing model pioneered by Merton, (1997) as a measure of public subsidies to quantify risk-shifting by connected banks to the safety-net. The deposit insurance pricing model is commonly used in banking literature to test for risk-shifting by banks to the deposit insurance fund (e.g. Duan, Moreau and Sealey, 1992; Hovakimian and Kane, 2000; Laeven, 2002; Hovakimian, Kane and Laeven, 2003; Wagster, 2007; Bushman and Williams, 2012; Carbo-Valverde, Kane and Rodriguez-Fernandez; 2012; 2013). Risk-shifting arises whenever a contractual counterparty is exposed to loss from leverage or volatility increases without adequate compensation. Merton (1977) models safety-net access in the form of deposit insurance as a put option that allows the shareholders of a bank to put its assets to the deposit insurer in the event of

[5] For example, Gropp and Vesala (2004) and Nier and Baumann (2006) study the effects of market discipline and moral hazard in banking in the presence of government safety-nets. Dam and Koetter (2012) study bank bailouts and moral hazard. Bhattacharya, Boot and Thakor (1998), Demirgüç-Kunt and Detragiache (2002) and Demirgüç-Kunt and Huizinga (2004) study risk-taking in relation to deposit insurance regulations.

insolvency. Importantly, Merton (1977) show that shareholders of banks can increase the value of the insurance premium at the expense of the deposit insurance fund by increasing both asset risk and leverage.[6]

Duan, Moreau and Sealey (1992) extend Merton's (1977) model and argue that regulatory and market forces serve to mitigate increases in asset risk by restricting bank leverage. In equilibrium, capital ratios should rise in accordance to asset risk to prevent risk-shifting to the deposit insurance system (Duan, Moreau and Sealey, 1992; Hovakimian and Kane, 2000).

Formally, the insurance premium per dollar of debt (IPP) can be approximated as a function of portfolio risk and leverage following Ronn and Verma (1986) and Duan, Moreau and Sealey (1992):

$$IPP = \gamma_0 + \gamma_1 \sigma_V + \gamma_2 (B/V) + \varepsilon \quad (1)$$

Where σ_V is the volatility of the bank's asset returns, B/V is the leverage ratio where B is the book value of debt and V the market value of bank assets. IPP can be interpreted as the fair insurance premium, i.e. the value that the writers of the put option (the FDIC, and by extension, the taxpayer as ultimate safety-net guarantors) receive for insuring the bank at a given combination of leverage and asset volatility. The computation of IPP requires two unobservable variables: the volatility and market value of assets. We describe the estimation of these two variables and the computation of IPP in Appendix B.

To examine the role of regulatory and market discipline, Duan, Moreau and Sealey (1992) establish a two-equation specification:

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[6] Merton (1977) derive partial derivatives and show that ($\partial IPP/\partial \sigma_V$) and ($\partial IPP/\partial (B/V)$) are both positive.

$$B/V = \alpha_0 + \alpha_1\sigma_V + \varepsilon_1 \quad (2)$$

$$IPP = \beta_0 + \beta_1\sigma_V + \varepsilon_2 \quad (3)$$

Equation (2) describes the disciplinary effects of leverage on asset volatility. To aggregate the effects of market and regulatory forces, we substitute Equation (2) into Equation (1) and obtain Equation (3). The slope coefficients of the equations (2) and (3) have the following interpretations:

$$\alpha_1 = (\partial B/V) / (\partial\sigma_V) \quad (4)$$

$$\beta_1 = (\partial IPP) / (\partial\sigma_V) = (\partial IPP / \partial\sigma_V) + (\partial IPP / \partial B/V)\alpha_1 \quad (5)$$

where α_1 reflects regulatory and creditor restraint on bank leverage for a given amount of asset volatility. A negative α_1 implies that a bank is required to decrease leverage as asset volatility increases. By contrast, β_1 captures the net effects of a bank's incentives to increase risk and the disciplinary effects of leverage.

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

Capital increases with volatility: $\alpha_1 < 0$

IPP does not rise with volatility: $\beta_1 \leq 0$

A negative α_1, while indicative of disciplinary forces imposed on a bank, would be insufficient to mitigate the incentives for risk-shifting. To fully neutralize risk-shifting incentives, the decline in leverage must be sufficiently large to offset increases in the value of the insurance premium that would be generated by increasing asset volatility. In this case, increasing asset risk leads to a sufficiently large increase in capital ratios to offset the gains obtained and banks would not find it advantageous to increase asset risk.

2.2 Hypotheses

In the Duan, Moreau and Sealey (1992) framework, regulatory and market forces are important disciplinary elements in constraining risk-shifting incentives. We are interested in the role that regulatory connections play in impeding discipline and permitting connected banks to shift risk to the deposit insurance fund. To empirically analyze the relationship between the level of bank regulatory connections and risk-shifting outcomes, we follow previous studies (Hovakimian and Kane, 2000; Wagster, 2007; Bushman and Williams, 2012; Carbo-Valverd, Kane and Rodriguez-Fernandez, 2012; 2013) and estimate equations (2) and (3) in first-difference form as:

$$\Delta(B/V)_{i,t} = \alpha_0 + \alpha_1 \Delta\sigma_{Vi,t} + \alpha_2 \Delta Con_{i,t} + \boldsymbol{\alpha_3(\Delta\sigma_{Vi,t} * Con_{i,t})} + \text{Controls} + \varepsilon_{i,t} \quad (6)$$

$$\Delta IPP_{i,t} = \beta_0 + \beta_1 \Delta\sigma_{Vi,t} + \beta_2 \Delta Con_{i,t} + \boldsymbol{\beta_3(\Delta\sigma_{Vi,t} * Con_{i,t})} + \text{Controls} + \varepsilon_{i,t} \quad (7)$$

where Δ is the first-difference change operator. *B/V* and σ_V are as previously defined. Controls is a vector of bank control variables. *Con* is our measure of regulatory connections and is defined as the total number directors that has or is presently serving in public service positions or was employed previously by regulators (the FED, FDIC, OCC, SEC, and State Banking regulators) scaled by board size. Our variables of interest are the coefficients on α_3 and β_3.

The coefficient α_3 captures the effects of bank connections on risk-discipline. By observing the sign on the interaction, we are able to examine if connections affects the disciplinary process. We propose the following hypotheses:

Hypothesis 1: Connected banks have lower levels of risk-discipline ($\alpha_3 > 0$).

Hypothesis 1a: Connected banks do not have lower levels of risk-discipline ($\alpha_3 \leq 0$).

The interaction term β_3 examines the incremental effects of regulatory connections on risk-shifting to the financial safety-net. A positive coefficient β_3 supports the hypothesis that connected banks are better able to extract incremental benefits and increase the value of the insurance premium by exposing the taxpayer to greater losses. Therefore:

Hypothesis 2: Connected banks extract higher public subsidies ($\beta_3 > 0$).

Hypothesis 2a: Connected banks do not extract higher public subsidies ($\beta_3 \leq 0$).

3. Data and descriptive statistics

3.1 Sample construction

Our initial sample consists of all listed US BHCs from 2000 to 2013 listed on BoardEx. BoardEx is maintained by Management Diagnostics Limited and contains biographical data on directors and other senior employees. BoardEx collects data from various sources including, but not limited to SEC filings, company press releases, corporate websites, and news outlets. We include BHCs with SIC codes starting with 602 (commercial banks) and 603 (savings institutions).

< INSERT TABLE 1 >

We then match the BoardEx list of BHCs with 4th Quarter FR Y9-C consolidated accounting information reported by BHCs to the Federal Reserve. Market information is obtained from CRSP. The final sample contains 3,011 bank-year observations and 448 unique BHCs. Definitions of the variables used in this study are described in Appendix A. Summary statistics of the variables are reported in Table 1.

3.2 Bank regulatory connections

Our main proxy of a bank's regulatory connections *Con* is defined as the number of connected directors on the board divided by the size of the board. Information on a director's employment history containing the dates of tenure, position and regulatory agencies served in are obtained from BoardEx. We manually supplement missing information from regulators' annual reports, legal documents, LinkedIn, Marquis Who's Who and news articles from credible vendors such as Bloomberg, WSJ and FT.

We define directors as connected if they meet either one of two criteria. First, directors have previously worked full-time for the Fed, FDIC, OCC, SEC, or a state banking regulator (revolving door director) before joining the board of the bank. In our sample, revolving door directors previously held jobs such as bank examiners, staff attorneys, banking commissioners and Fed Reserve Bank presidents. We list the main positions revolving door directors held in regulatory bodies in Panel E of Table 1.

Second, they are currently serving or have served in public service positions while being employed by a sample bank (public service advisors). Panel F in Table 1 the committees, councils and positions that directors in our sample have or is currently serving in. Almost all of the public service positions are with the Fed and consist of Federal Reserve Bank board directorships and various councils.

Directors of the Federal Reserve Bank boards are responsible for supervising the Reserve Bank's operations, formulation of monetary policy, internal audits, corporate governance functions and evaluation of President and First Vice-President. Importantly, they are excluded from all issues related to bank supervision (Board of Governors of the Federal Reserve System, 2013). The Fed also relies on advisory councils to carry out its responsibilities 'These committees advise the Bank on matters of importance in the Bank's District, such as agriculture and small business' (Board of Governors of the Federal Reserve System, 2015). For example, the Community Depository Institutions Advisory Council at the New York Fed 'is composed of representatives from commercial banks, thrift institutions and credit unions in the Second District. The purpose of the council is to provide information and insight to the New York Fed from the perspective of community depository institutions. The New York Fed president and first vice president meet with the council twice a year to discuss regional economic and financial conditions, and other relevant issues' (Federal Reserve Bank of New York, 2015).

Panel B of Table 1 shows some descriptive statistics for our connections variable. In total, 31.48% of bank years have at least one connected director. The most common connection is to the Federal Reserve (84%). Banks are also more likely to be connected via public service appointments (86%) as compared to post-employment (revolving door) appointments (14%).[7]

We also use an alternate definition for regulatory connections as a robustness check. *ConTenure* is the total number of years that all the connected directors of the bank board have spent in regulatory agencies. As the time spent in agencies increases, directors would have more opportunities to establish connections and networks. The average time spent by directors of connected banks in agencies is 2.17 years.

[7] The total nominal number of each category of connection differs as a number of directors have multiple positions in different agencies.

3.3 Control variables

Changes in the insurance premium *(IPP)* by construction is related to changes in portfolio risk (σ_V). We further include a range of control variables in equation 6 and 7 corresponding to the CAMEL ratings system, a supervisory ratings system used by the FDIC to calculate the overall stability of bank and its insurance premium.[8] CAMEL is an acronym for capital adequacy, asset quality, management quality, earnings and liquidity. As we are unable to observe the CAMEL ratings issued by regulators, we employ proxies for each component.

We measure capital adequacy as the Tier-1 capital ratio *Tier1 Capital*. Banks with lower capital ratios could have more incentives to shift risk or, alternatively, have limited risk-shifting opportunities due to increased regulatory scrutiny. We employ *Bad Loans* as a proxy for asset quality where higher values should be associated with a higher insurance premium. *Enforcement actions* can be seen as a proxy for management quality (Duchin and Sosyura, 2012). We hand collect enforcement actions data (i.e. Formal Agreements, Cease and Desist Orders, Prompt Corrective Actions and Civil Money Penalties) from the websites of the three federal regulators.[9] When enforcement actions are issued against a commercial bank under the BHC, we assign the enforcement action to the holding company.[10] The quality of the management of the bank is crucial in all affecting all bank policies. We further control for bank profitability using return on assets *ROA*. All else equal, a higher ROA should be associated with a lower risk and, correspondingly, a

[8] Additional information on risk categories and assessment rates can be found at: https://www.fdic.gov/deposit/insurance/assessments/risk.html

[9] Federal Reserve: http://www.federalreserve.gov/, FDIC: https://www5.fdic.gov/edo/ and OCC: http://apps.occ.gov/EnforcementActions/

[10] Shive and Forster (2014) find that financial institutions are more likely to hire ex-regulators in anticipation of regulatory enforcement actions. Including enforcement actions in our models thus also alleviates an omitted variable issue that could be correlated with the regulatory connectedness of the bank.

lower insurance premium. *Total Deposits* proxies for liquidity. Banks with liquid liabilities are more able to cope with unexpected losses, lowering the risk of default, and subsequently the insurance premium. Additionally, Hovakimian and Kane (2000) find that banks with higher deposits experience more intense risk-shifting.

Further, we control for bank size using *Log Total Assets* and *Charter Value* as the ratio of the market value of equity to the book value of equity. Charter value measures a bank's incentives to take on risk. Keeley (1990) explain that the owners of banks with high charter values are less inclined to increase risk as insolvency dissolves the benefits of a highly valued charter arising from the banking business. *Asset Growth* and *Total Loans* measure the aggressiveness of expansion and the lending focus of a bank, respectively and could affect risk and IPP.

Finally, we include a number of governance variables as controls. *Board Size* controls for the coordination costs of acquiring information with respect to the monitoring and advisory functions of the board (Yermack, 1996). *Board Independence* captures the proportion of independent directors on the board. The quality of board monitoring and advising could influence bank leverage and risk-shifting. Finally, we control for the power of a CEO in affecting risk policies using *CEO Tenure* and *Duality* (an indicator variable which is equal to 1 if the CEO is also the Chairman) as measures of CEO power.

4. Results

4.1 Characteristics of connected banks

We begin our analysis by first examining the characteristics of connected banks by running regressions on the proportion of board members with regulatory connections. We are particularly interested to understand if connected banks are more risky than their unconnected peers or have other characteristics which could hint at whether or not connected banks are prone to risk-shifting.

The results are displayed in Table 2. Columns 1-2 employ bank fixed-effects while Column 3-4 use random-effects to investigate cross-sectional variation. The fixed-effects estimations control for unobserved heterogeneity across BHCs and capture within-BHC changes when connections change. Columns 2 and 4 lag all dependent variables.

In many ways, the results are surprising. The results show that connected banks exhibit higher quality loans (the negative coefficient on *Bad Loans* is significant below 10% in most specifications) and engage in more traditional lending based activities (as indicated by a statistically significant coefficient on *Total Loans*). Notably, the portfolio risk of banks (as indicated by σ_V) is statistically insignificant implying that banks with regulatory connections engage in a no more or less risky activities than unconnected banks.

< INSERT TABLE 2>

Further, BHC age is positively correlated with the connectedness of a bank. Evidently, older banks are more likely to afford higher visibility and reputation to directors, allowing them to attract and accumulate connections to regulators. Finally, *Charter Value* is negatively associated with bank regulatory connections suggesting that connected banks have more incentives to increase risk (Keeley, 1990).

Jointly, the results indicate that connected banks are in good financial conditions and provide no reason for additional regulatory scrutiny. In the next two sections, we examine if regulatory connections are associated with lower risk discipline and higher safety-net subsidies, respectively.

4.2 Regulatory connections and risk-discipline

Table 3 reports the results of the effects of regulatory connections on risk-discipline (as described in Equation 6). We estimate all models in Table 3 using fixed-effects and cluster standard errors by bank. The use of within-variation helps correct for unobserved time-invariant omitted variables such as an institution's culture of risk management. Column 1 of Table 3 estimates a conventional baseline model as in Duan, Moreau and Sealey (1992), Hovakimian and Kane (2000), Wagster (2007) and Williams and Bushman (2012). Column 2 introduces our interaction term of interest $\Delta\sigma v$ * *Con*. Column 3 adds financial controls and Column 4 incorporates board governance variables.

< INSERT TABLE 3 HERE >

The coefficient on our interaction term of interest $\Delta\sigma v$ * *Con* is positive and statistically significant at the 1% level in all models. This shows that, as the proportion of regulatory connections increases, connected banks are able to hold less capital for the same level of asset risk than unconnected banks. This confirms that connected banks benefit from lower risk-discipline and that the presence of connections decreases the costs to bank shareholders for increasing portfolio risk. In column 5, we use our alternate definition of connections and regress IPP on total regulatory tenure. We continue to find that $\Delta\sigma v$ * *ConTenure* is significant at the 1% level.

4.3 Regulatory connections and risk-shifting

As outlined in Section 3, weakened risk discipline is a necessary but not sufficient condition for the ability of connected banks to shift risk to the financial safety-net. For banks to be able to shift risk, they need to be able to increase the value of the taxpayer put via regulatory connections.

< INSERT TABLE 4 HERE >

Table 4 reports results from the second equation of the Duan, Moreau and Sealey (1992) framework as described in Equation 7. This regression measures the sensitivity of the fair deposit insurance premium (the taxpayer put) to changes in portfolio risk. Our key coefficient of interest $\Delta\sigma v$ * *Con* is statistically significant and positive at 1%. Thus, connected banks extract higher public subsidies from the safety-net as compared to unconnected banks. Connected banks are able to increase risk without holding an adequate amount of additional capital to protect against possible losses, thereby, shifting potential losses to the taxpayer. As previously, this finding is robust to us using a different definition of connections *ConTenure*.

The identification of a causal link between board connections and bank risk-shifting may be confounded due to concerns of endogeneity. For our study, we identify two types of endogeneity: 1) reverse causality and time-variant omitted variable bias and 2) self-selection that might affect inference. Accordingly, we use an instrumental variable (2SLS) and a Heckman (1979) two-step approach to address the various forms of endogeneity respectively.

We first address concerns of reverse causality between connections and risk-shifting. Perhaps, risk-shifting banks could actively seek out or establish regulatory connections in a bid for leniency in supervision. While we control for time-invariant unobservable using firm fixed-effects and control for a range of bank characteristics, it is still possible that time-variant unobservable firm characteristics could jointly affect both regulatory connections and risk-shifting. For instance, an unexpected operational loss event may alter a banks' corporate risk culture and cause banks to hire directors with regulatory connections to safeguard against supervisory scrutiny.

To circumvent these concerns, we exploit the role of a bank's age in facilitating connections between regulators and bank boards. Specifically, we use the age of a BHC *BHCAge* as an instrumental variable in a 2-Stage Least Squares (2SLS) approach. We argue that older banks are more likely to be more connected due to the higher market visibility and reputation. Additionally, it is not obvious that bank age should be related to changes in deposit insurance premium except through regulatory connections.

Our two first-stage estimation fitted values are obtained from Columns 5 and 6 of Table 2. We instrument for *Con* and $\Delta\sigma v$*Con* using *BHCAge* and $\Delta\sigma_V$*BHCAge*, respectively. The Kleibergen-Paap F-statistic is 10.4 (above the conventional value of 10, commonly viewed as a threshold in literature), alleviating concerns of weak instruments. In the first-stage, the coefficients on our instrument have the expected signs and are positive. The second-stage regression results are reported in Column 6 of Table 4. The coefficient on $\Delta\sigma v$ * *Con* remains positive and statistically significant at the 1% level.

We further formally account for self-selection using a Heckman (1979) two-step maximum likelihood estimation. It is plausible, for instance, that ex-regulators could self-select into the most highly leveraged or otherwise risky banks on the understanding that their expertise will be most valued by these institutions.

Column 8 controls for the self-selectivity of connections using the Heckman (1979) two-step estimation. The selection equation is a probit model with controls as specified in Column 1 of Table 2 and dependent variable equaling one if the bank has any connected directors in a year and zero if otherwise. The inverse Mill's ratio (Lambda) is included into the second stage equation (Column 8) to account for the selectivity effect. Our interaction term $\Delta\sigma v$*Con* continues to remain significant and positive. In Column 7 of Table 4, we provide further evidence against self-selection by employing our baseline fixed-effects regression with only connected banks. The results suggests cross-sectional differences exist even within connected banks and that higher proportion of connected board members leads to higher levels of risk-shifting.

Overall, the results show a strong causal relationship between regulatory connections and risk-shifting even after controlling for self-selection and are consistent with results obtained using fixed-effects estimators, alleviating concerns of endogeneity driving our main findings.

4.4 Regulatory connections, risk-shifting and payouts and performance

Previous sections have established that connected banks are able to shift risk to the taxpayer by increasing the value of the deposit insurance put option. In line with risk-shifting theory, we next analyze if risk-shifting at connected banks benefits shareholders. If so, this would be consistent with the notion of a wealth transfer from the safety-net guarantors to shareholders in connected banks. We measure shareholder benefits in terms of payout to and valuation gains for shareholders.

< *INSERT TABLE 5*>

Columns 1-3 of Table 5 investigate payouts to shareholders while columns 4-5 show accounting and stock returns. Following Boudoukh, Michaely and Richardson (2007), we calculate the net payout to shareholders as the sum of common dividends and net repurchases (common dividends + treasury stock repurchase – treasury stock sales). We scale this by the book value of equity and call the resulting variable *Net Payout*. Further, we run regressions to examine whether banks have increased payout relative to the previous year on *Net Payout* ↑ and Pr*(Net Payout* ↑)

based on a conditional logit model. Columns 4 and 5 show regressions on stock *Buy-Hold Annual Rets* and accounting *ROA* performance.

As previously, our variable of interest is the interaction term $\Delta IPP * Con$. A positive coefficient on the interaction term would mean that as the deposit insurance put option increases (IPP increases), connected bank shareholders would benefit more through higher payouts and performance, all else being equal. The results in Table 5 show that shareholders benefit as banks engage in risk-shifting on the back of regulatory connections. The coefficients on the interactions are positive and significant indicating that as risk-shifting increases, connected banks have a higher probability of increasing payouts and enjoy higher stock and accounting performance.

In sum, we document that shareholders of connected banks are more likely to receive an increase in payouts and enjoy better performance as risk-shifting increases. This suggests that regulatory connections result in a wealth transfer from taxpayers to shareholders of connected banks.

5. Why do we observe risk-shifting?

Understanding which types of connections are associated with risk-shifting helps us shed light on the channels through which risk-shifting occurs. In this section, we exploit detailed data on the types of connections to investigate the channels which permit connected banks to shift risk to the safety-net. In particular, we test whether two commonly cited reasons can explain our findings. First, quid-quo-pro behavior, where regulators are unduly lenient to the banks they regulate to secure employment with them in the future and knowledge transfer, where the industry acquires relevant expertise on supervision and enforcement in order to evade it (Cohen, 1986; Che, 1995; Dal Bó, 2006; Lucca, Seru and Trebbi, 2014; DeHaan, Koh, Kedia, Rajgopoal, 2014;

Cornaggia, Cornaggia and Xia, 2014) The results of the tests we present below lend support to neither of these implantations behind risk-shifting by connected banks and suggest an alternative explanation based on a psychological bias induced by social connections or homophily of working experience (Mills and Clark, 1982; Silver, 1990; McPherson, Smith-Lovin and Cook, 2001).

5.1 Quid-pro-quo

We first test if quid-pro-quo arrangements are the reason behind risk-shifting by connected banks. Connected banks might use their connections to obtain laxity in supervision in exchange for private benefits from regulators (Cohen, 1986; Che, 1995; Dal Bó, 2006; Lucca, Seru and Trebbi, 2014; DeHaan, Koh, Kedia, Rajgopoal, 2014). As quid-pro-quo exchanges are almost impossible to detect empirically (Kane, 2014), we rely on state level measures of corruption and integrity to capture the quality of the institutional environment. Cross-country studies have shown that weaker institutions leave more discretion in the hands of policymakers and more opportunities for corruption (cf. Dinç, 2005, Beck, Demirgüç-Kunt and Levine, 2006; Barth, Lin, Lin and Song, 2009). We exploit variation in corruption and personal integrity at the level of US states to capture the quality of the institutional environment for different banks.

< INSERT TABLE 6>

We use two variables for our analysis. First, *State Corruption Score* is a normalized score based on a survey by Boylan and Long (2003) of State House reporters in 2003 on the level of corruption in their respective states. Second, *State Integrity Index* is a state level index created by aggregating measures of freedom of information laws, whistle-blower protection laws, campaign finance laws, open meeting laws and conflict of interest laws in 2008 by the Better Government Association. We use only state chartered banks to allow for exposure to state level institutions in this analysis. State chartered banks are chartered by their respective states regulators and either the Fed or FDIC.

The results of our test are displayed in Table 6. The constant term and controls are suppressed for brevity. Columns 1 and 3 control for state level corruption and integrity. Columns 2 and 4 interacts our variable with the state level measures but finds no evidence that differences in institutional environment affects risk-shifting brought upon by connections. The coefficient of our variable of interest $\Delta\sigma v$ * *Con* remains positive and statistically significant at 1% in all 4 Columns while none of the interaction terms with institutional quality enter significantly. Therefore, we do not find evidence of risk-shifting being more pronounced in weaker institutional environments. Further, we interpret the result of the triple interaction term as inconsistent with the explanation of connections facilitating quid-pro-quo arrangements which banks exploit to gain access to higher safety-net benefits. This is consistent with recent studies from Agarwal, Lucca, Seru and Trebbi, (2014) and Lucca, Seru and Trebbi (2014) who do not find evidence of quo-pro-quo being related to the efficacy of banking enforcements.

5.2 Knowledge transfer

To test whether knowledge transfer from regulatory agencies to banks can explain our findings, we start by investigating if only revolving door appointments explain risk-shifting at connected banks. Directors appointed through the revolving door could leverage their technical expertise on how to shift risk and maximize shareholder wealth (Cohen, 1986; Che, 1995; Dal Bó, 2006; Lucca, Seru and Trebbi, 2014; DeHaan, Koh, Kedia, Rajgopoal, 2014). Crucially, under the knowledge transfer conjecture, we would not expect public service connections—which involve no input into supervisory or enforcement matters—to facilitate risk-shifting.

Revolving door directors vs. public service connections. We rely on detailed employment histories of directors to identify if a director's connections stems from revolving doors or through serving as a public service advisors. Revolving door connections *ConRevolving* is defined as the number of directors who have worked full-time at any of the relevant regulatory agencies before joining the bank divided by board size. In contrast, public service connections *ConPublicService* is the number of directors who have or are serving in public service roles scaled by board size.

< INSERT TABLE 7>

We re-estimate equations (6) and (7) with our proxies for revolving door and public service connection variables. Table 7 estimates the effects of these two measures of connectedness with regards to risk-discipline and risk-shifting. Both types of connections—revolving door and public service connections—permit banks to engage in risk-shifting. Further, the magnitude of the risk-shifting is not statistically different through either type of connection.[11]

While it is plausible that revolving door directors possess technical expertise that facilitates risk-shifting, it is unlikely to be the primary reason behind our observations of risk-shifting at connected banks. If so, connections established on an advisory basis without formal input into supervision and enforcement should not lead to the same level of risk-shifting as revolving door appointments.

Does it matter which regulator the connections are to? Next, we offer further evidence against knowledge transfer as an explanation for our findings of risk-shifting by connected banks.

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[11] We perform a *t*-test (null: $\Delta \sigma v$ * ConPublicService = $\Delta \sigma v$ * ConRevolving) in Column 5 to test if both interaction terms are statistically similar. Failure to reject the null (p=0.12) suggests that the effects of both types of connections on risk-shifting are similar.

The bank regulatory landscape of the US offers a suitable setting in which to test the relevance of knowledge transfer. Although the Federal Reserve regulates all BHCs, the charter type of the commercial bank operating under the BHC dictates its federal regulator. Nationally chartered commercial banks are regulated by the OCC. The Fed regulates state chartered banks that are members of the Federal Reserve System while non-member state banks fall under the jurisdiction of the FDIC.

< INSERT TABLE 8 >

Crucially, regulations pertaining to the deposit insurance premium are based on CAMELS ratings which are assigned by the bank's relevant regulators and correspond to the riskiness of the bank.[12] Bank examinations of bank leverage and risk are designed to be identical regardless of the regulator (Agarwal, Lucca, Seru and Trebbi, 2014). We therefore conjecture that since supervisory rules are uniform across regulatory bodies, connections to any bank regulatory body should be associated with risk-shifting to the safety-net if connections were related to technical expertise or knowledge transfers. Banks with Fed connections should be able to risk shift irrespective of whether they are regulated by the FDIC or the OCC.[13]

[12] See https://www.fdic.gov/deposit/insurance/assessments/risk.html.

[13] While Agarwal, Lucca, Seru and Trebbi (2014) find that different regulators enforce similar rules inconsistently; their results show that systematic differences in the way regulators rate banks is differentiated at the state and federal level. They explain that state banking regulators are more lenient to banks due to concerns over the local economy while federal regulators are harsher as a result of their emphasis on systemic stability. The authors say little about differences in enforcement at the federal level. The results we report in this paper are consistent with uniform enforcement. Table 11 shows in our robustness tests (Section 6) that federal regulators (OCC, Fed and FDIC) are similar in their enforcement.

We re-run our regression using the number of directors with connections to the Fed divided by board size Con*FED*.[14] We use the number of connections to the Federal Reserve because it is by far (84%) the most common agency which banks are connected to, allowing for variation between the different sub-groups. Column 1, 2 and 3 of Table 8 show subsamples of commercial banks that are regulated by the Fed, OCC and FDIC respectively. The interaction term of interest $\Delta\sigma v$ * *ConFED* is positive and significant at the 1% level in Column 1, indicating that commercial banks with connections to the Fed, that are also regulated by the Fed are able to shift risk to the financial safety-net.

Notably, connections to non-relevant regulators do not result in detectable risk-shifting behavior by connected banks, further showing evidence that connections do not act as conduits for knowledge transfers or are related to technical expertise. Finally, it is also worth pointing out that the adjusted R^2 in Column 1 is very high (0.79). This further suggests that relevant connections (i.e. connection to the Fed by banks regulated by the Fed) have extremely high explanatory power for risk-shifting incentives.[15]

[14] We use FED connections because there are a large number of FED connections. There are too few FDIC and OCC connections to draw conclusions from. For instance, we have 0 FDIC connections under FDIC regulated banks

[15] Another advantage of this test is that we can also rule out explanations that director who are connected are more talented or possess other unobservable qualities that facilitates risk-shifting. Bond and Glode (2014) theorize that bankers are on average more skillful than regulators and that regulatory agencies lose their best employees to the financial industry. Accordingly, Lucca, Seru and Trebbi (2014) show that banking regulators with high levels of human capital spend less time in regulatory bodies before transitioning to the private sector. These directors would then carry with them connections to regulators (our main measure of bank connections). Additionally, bank directors who are more able could also be given more opportunities of establishing regulatory connections through public service positions such as Federal Reserve directorships or serve as advisors in Advisory Councils. However, if connected regulators had some unobservable characteristic that makes them both more likely to be connected and better and extracting value from the safety-net, this effect should be detectable no matter to which agency connections exist.

5.3 Discussion

Taken together, our results show that banks have access to higher safety-net benefits when they are connected to regulators, irrespective of how the connections are made (via hiring of ex-regulators or through advisory functions), but only if connections are made to the responsible regulator. Further, we rule out explanations of connections facilitating quid-pro-quo or connections being related to technical expertise and channels for knowledge transfers as the main driver behind our results and instead suggest an alternative explanation.

Overall, the collective evidence suggests that connections and relationships established by directors while being in regulatory bodies leads to a psychological bias in treatment by regulators, undermining the supervisory process. Social bonds between regulators and bankers change the supervisor-supervisee dynamics to a communal relationship (Mills and Clark, 1982; Silver, 1990) which clouds objective monitoring.[16]

Crucially, the psychological bias explanation need not rely on direct interpersonal connections between connected directors and the regulators examining the bank. Regulators might simply be aware that connected directors have connections in the agency, and as a result, be more lenient in supervision (nicer to friends of friends).[17]

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[16] Indeed, lower levels of monitoring due to social connections between the CEO and board members leading to worst firm outcomes are observed in studies of board corporate governance (e.g. Hwang and Kim, 2009; Fracassi and Tate, 2012; Khanna, Kim and Lu, 2014).

[17] Another non-mutually exclusive reason could be that regulators who are currently serving in agencies and directors, who have served in these agencies enjoy common experiences which facilitates interaction leading to mutual understanding and trust (Mills and Clark, 1982; Silver, 1990; McPherson, Smith-Lovin and Cook, 2001). This homophily (i.e., affinity for others with similar backgrounds) could also weaken the supposedly independent relationship between regulators and banks by expediting the formation of connections to regulators.

Our conclusion is also backed up by other findings reported in this paper (that longer tenures of connected directors in agencies increase risk-shifting). As tenure increases network size, strength of connections and a commonality of experience in regulatory agencies, we view this as evidence pointing to a psychological bias. We support explanations put forth by Barth, Caprio and Levine (2012) of a psychological bias induced by close relationships between well-intentioned regulators and banks as a reason behind supervisory laxity leading to the crisis.

6. Robustness tests

This section explores the robustness of our findings to various alternative explanations.

6.1 Market discipline

The Duan, Moreau and Sealey (1992) framework relates changes in the value of the deposit insurance premium to external disciplinary forces. Should market and regulatory forces be sufficient in restraining risk-shifting activities, we should not observe an increase in insurance premiums when portfolio risk increases. However, regulatory connections might lead to a decrease in monitoring by market investors due to assumptions that connected banks are more likely to be bailed out when distressed (see for e.g. Duchin and Sosyura, 2012). If so, our results would not be guided by banks with regulatory connections gaining preferential treatment but be driven by laxity of market participants.

To investigate the effects of market discipline, we follow the literature and use subordinated debt as a proxy for creditor discipline (Ashcraft, 2008; Schaeck, Cihak, Maechler and Stolz, 2012).[18] We follow Ashcraft (2008) and use the ratio of subordinated debt to the sum

[18] Other studies make use of debt yields or spreads. Avery, Belton and Goldberg (1988) find no evidence that debt spreads were sensitive to risk using a sample of the largest 100 US BHCs. Flannery and Sorescu (1996) use data from 1983 to 1991 on BHC debenture yields and find that spreads were sensitive to different measures of risk. Bliss and

of subordinated debt plus Tier1 capital *Sub Debt* to proxy for debt-holder discipline. A higher proportion of subordinated debt to capital should be associated with more stringent monitoring of risk. Regression results of the disciplinary effects of the change in leverage on risk are presented in Panel A of Table 9 while Panel B show results of risk-shifting incentives. Columns 1-3 use the full sample, Columns 4-6 and 7-9 show samples of small and large (assets below and above the median) BHCs respectively.[19] We split our sample by bank size as market discipline at large banks could be ineffective due to implicit bailout guarantees of being too-big-to-fail (Ashcraft, 2008)

<INSERT TABLE 9>

There appears to be some evidence of market disciplinary effects on risk-shifting in small banks ($\Delta\sigma v$ * *Sub Debt* is negative at 5% in Columns 4 and 5). This is consistent with results from Ashcraft (2008) who find disciplinary effects of subordinated debt only in smaller banks. However, our main results $\Delta\sigma v$ * *Con* remain robust and significant even after controlling for the effects of market discipline in all regressions. Additionally, creditor discipline does not appear to moderate the effects of risk-shifting driven by regulatory connections from the insignificant coefficients on $\Delta\sigma v$ * *Con* * *Sub Debt* in most columns. Overall, we find no evidence that our findings are driven by a reduction in market discipline at connected banks.

6.2 Size driven effects

Another interpretation of our results could arise due to size effects being positively related to connectedness. Large banks could enjoy competitive advantages when recruiting directors with

Flannery (2002) study BHCs in the US and find no evidence that bank behaviour responded to stock price changes and conclude that both shareholders and bondholders do not influence managerial action.

[19] The constant and control variables are suppressed for brevity and are available upon request.

regulatory experience or be granted more opportunities to take on public service positions (Adams, 2013).[20] Subsequently, large banks could also be more likely to shift risk onto the safety-net as a result of being too-big-to-fail (Carbo-Valverde, Kane and Rodriguez-Fernandez, 2013). If large banks simultaneous have more incentives to risk-shift also have more connections, we may be wrongfully attributing our results to size effects.

< INSERT TABLE 10 >

A number of tests are conducted to investigate if our results are driven by bank size. First, our results remain robust after we exclude the top 5%, 10% and 20% of banks ranked by assets at the end of 2007 in Columns 1-3 of Table 10.[21] We control for risk-shifting incentives of large banks in Columns 4-6 by interacting $\Delta\sigma v$ with a size dummy and find similar results. Interestingly, we find that the largest banks (top 5%) with connections engage in incremental risk-shifting $\Delta\sigma v$ * *Con* * *Top5%Asset* consistent with moral hazard of being too-big-to-fail.[22] We find no support that our results are driven by connections being related to size.

6.3 Regulatory effects and charter type

The regulatory framework in the US allows banks to select their federal regulator through their choice of charter type. A body of literature studies the motivations of bank's choice of

[20] Adams (2013) find that directors of larger banks are disproportionately more likely to be elected to Federal Reserve directorship positions.

[21] The year of ranking is arbitrarily chosen. Multiple ways of ranking banks by assets are tested and produce quantitatively similar results.

[22] We also interact $\Delta\sigma v$ * *Con* with the Top10% and Top20% dummy but find that the coefficient on the triple interaction term is insignificant.

regulators as well as differences that exists between the regulatory bodies (Rosen, 2003; 2005; Rezende, 2011; Agarwal, Lucca, Seru and Trebbi, 2014).

We control for possible heterogeneity in supervision across federal agencies by controlling for commercial bank charter type in Columns 1-2 of Table 11. Further, we also control for Federal Reserve Bank Districts (1-12) that a BHC falls under based on geographical locales in Column 3. Our results remain robust even after controlling for differences in regulatory effects as well as preference of charters.

< INSERT TABLE 11>

6.4 Financial crisis

The financial crisis of 2007 to 2008 resulted in an unprecedented magnitude of government investments and bailout of banks. Duchin and Sosyura (2012; 2014) find that politically connected banks are more likely to receive bailout funds in the crisis and subsequently engage in riskier activities. Berger and Roman (Forthcoming) further show that bailed-out banks in the crisis increase both their market-power and market share. Consequently, this infusion of capital to politically connected and unconnected banks could alter bank business strategies and policies.

We exclude the crisis years of 2007 to 2008 and carry out main regression for risk-shifting. The results are displayed in Column 1 of Table 12. The interaction $\Delta\sigma v$ * *Con* is still significant and positive, alleviating any concerns that the financial crisis and disbursement of bail-out funds is driving our results.[23]

[23] We also exclude years 2007 to 2009 as well as 2008 to 2009 in unreported regressions and find similar results.

6.5 Exclusion of worst performing banks

Badly performing banks could be more incentivized to shift risk as they have less to lose when nearing default (Bushman and Williams, 2012). We exclude the bottom 20% worst performing bank years as measured by ROA to test if poorly performing banks are driving our results.[24] The results are displayed in Column 2 of Table 12. The coefficient of $\Delta\sigma v$ * *Con* remains positive and significant, ruling out concerns that our results may be driven by poorly performing banks that have larger incentives to shift risk.

< INSERT TABLE 12>

6.6 BoardEx data start date

Another concern that might arise relates to our sample of banks selected for inclusion in this study. BoardEx began populating data on board executives from 1999 but consisted only of the largest firms. It began to reach full capacity only in 2003. We re-estimate our main regressions using data starting from 2004 to address any concerns of sample selection. The results are shown in Column 3 of Table 12 and remain consistent and robust.

6.7 Alternate measures of IPP

We re-estimate our main regression using IPP and σv derived from Duan (1994) Maximum likelihood estimations (ML). Estimations of IPP and σv are provided by Carbo-Valverde, Kane and Rodriguez-Fernandez (2013).[25] We match data from their paper to our sample and compare summary statistics. IPP and σv obtained by ML estimates are 0.13% and 1.4% respectively while

[24] Our results are similar when excluding the bottom 10% or bottom 30% as measured by ROA.

[25] We thank Santiago Carbo, Francisco Fernandez and Ed Kane for sharing their data.

we calculate values of 0.2% and 3%. It should be noted that we are interested in the change in IPP with respect to σv and thus exact values of IPP and σv are less important.

The results for our regression using values obtained by ML estimates are reported in Column 4 of Table 12. The coefficient of $\Delta\sigma v * Con$ remain robust and significant at the 5% level.

7. Conclusions

This study analyzes if connections between regulators and banks allow banks to shift risk to the financial net. Specifically, we estimate the safety-net subsidies pertaining to banks when they are able to increase leverage and asset risk under a put that is ultimately underwritten by taxpayers. We show that banks with connections to regulators receive preferential treatment and hold less capital for the same level of risk than unconnected banks. Further, this risk-shifting by connected banks leads to a wealth transfer from taxpayers who underwrite the put to the shareholders of connected banks who benefit from higher returns and a higher probability of increased in payouts.

We also study the channels of influence through which connections lead to risk-shifting by connected banks. We find no evidence consistent with either quid-quo-pro behavior by regulators or a knowledge transfer from regulators to industry when ex-regulators are hired through a revolving door appointment as a driving force behind our results. Instead, our results support the view that personal interactions between regulators and bankers undermines the supervisory process. It appears that in the presence of personal ties between regulators and senior bankers, connected institutions are treated more leniently, thus, facilitating a wealth transfer from taxpayers—whose interest regulators are meant to protect—to the shareholders of connected banks.

Our study draws attention to a dark side of interactions between regulators and senior bankers and suggests that connections between regulators and bankers warrant more scrutiny. Our finding that connected banks can equally shift risk on the back of connections established through advisory roles performed by bankers (which carry no formal decision-making powers over matters of supervision and enforcement) is particularly notable. First, it suggests that attempts to further limit conflicts of interest between regulators, e.g. by restricting the brief of advisory directors, are unlikely to be effective. Our findings suggests that risk-shifting is driven by personal familiarity (rather than formal influence) and not the decision-making powers of the connected directors. Second, connected banks do not bear sole responsibility for the observed risk-shifting to the financial safety-net. Regulators will equally have to ask themselves why connections undermine the supervisory process even if the connections are not made by hiring ex-regulators.

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Table 1

Descriptive Statistics

This table contains summary statistics for the key variables. 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 percentile. Panel B to D show the nominal number of each type of connection described under description. The total connected bank years in Panels B to D differ as 1 director can hold more than 1 position. Panel B contains the nominal amount of the number of bank years with at least 1 connected director. Panel C describes the number of banks years as defined according to how the connection is made. Panel D presents the number of bank years defined according to the regulatory body in which the connection is made.

Panel A	N	Mean	Median	Std Dev.	p1	p99
Financial Variables						
IPP (%)	3,011	0.285	0.000344	1.131	0	4.456
σv (%)	3,011	3.333	2.849	2.495	0.579	12.20
Leverage (B/V %)	3,011	89.80	89.67	6.853	73.16	103.1
V (Million)	3,011	34,207	2,125	195,248	294.7	1273114
Tier 1 Capital	3,011	0.0899	0.0874	0.0269	0.0466	0.151
Bad Loans	3,011	0.0131	0.00747	0.0162	00004	0.0796
ROA (%)	3,011	0.586	0.863	0.0132	-5.69	2.14
Total Deposits	3,011	0.757	0.774	0.0899	0.464	0.898
Log (Total Assets)	3,011	6.480	6.320	0.687	5.460	9.102
Charter Value	3,011	1.464	1.348	0.838	0.146	3.916
Asset Growth	3,011	0.0854	0.0547	0.171	-0.158	0.726
Total Loans	3,011	0.673	0.690	0.123	0.316	0.890
Sub Debt	3,011	0.0399	0	0.0859	0	0.3421
Cash	3,011	0.0432	0.0307	0.0411	0.0075	0.237
Buy-Hold Annual Rets	3,011	-0.0156	0.0161	0.3575	-0.9577	0.8415
Noninterest Income	3,011	0.1827	0.1627	0.1183	-.00623	0.6047
Payout Variables						
Net Payout	3,011	11.55	8.85	12.98	-0.03	59.47
Div	3,011	8.59	7.93	6.96	0	26.78
Net Repo	3,011	2.96	0	9.25	-4.62	38.26
Pr(Net Payout ↑) & Net Payout ↑	3,011	0.43	0	0.49	0	1
Financial Variables used in Appendix B						
σE (Annualized)	3,011	0.302	0.230	0.225	0.0718	1.297
B (Millions)	3,011	31,110	1,900	182,698	265.5	1157816
E (Millions)	3,011	4,083	270.1	20,632	8.500	120,049
Board Variables						
Board Size	3,011	11.82	11	3.442	6	22
Board Independence	3,011	0.780	0.800	0.120	0.438	0.933
CEO Tenure (Years)	3,011	11.20	9.400	8.243	0.300	34.80
Duality	3,011	0.496	0	0.500	0	1
Bank Structure Variables						
RegbyFED	3,011	0.217	0	0.412	0	1
RegbyFDIC	3,011	0.493	0	0.500	0	1
RegbyOCC	3,011	0.290	0	0.454	0	1
Enforcement Actions	3,011	0.0927	0	0.429	0	2
BHCAge (Years)	3,011	21.61	21	13.01	2	78
Connection Variables						
Con	3,011	0.0347	0	0.0595	0	0.250
ConPublicService	3,011	0.0309	0	0.0553	0	0.250
ConRevolving	3,011	0.00421	0	0.0195	0	0.111
ConTenure (Years)	3,011	2.17	0	4.75	0	23.33
ConFED	3,011	0.0315	0	0.0562	0	0.250

Description	Total Bank Years (N = 3011)	% of Bank Years (N = 3011)
Panel B		
% by connected bank		
At least 1 connected director	948	31.48
Total connected bank years	948	31.48
Panel C		
% by type of connection		
At least 1 ex full-time employed connected director	144	4.78
At least 1 public service connected director	881	29.26
Total connected bank years	1025	34.04
Panel D		
% by type regulatory type of connection		
At least 1 Fed connected director	882	29.29
At least 1 FDIC connected director	11	0.37
At least 1 OCC connected director	42	1.39
At least 1 SEC connected director	47	1.56
At least 1 State connected director	61	2.03
Total connected bank years	1043	34.64

Panel E

Revolving Door positions held in sample

Positions

Analyst, Assistant Deputy Comptroller, Division Associate Director, Associate General Counsel, Staff Attorney, FDIC Chairman, Chief Counsel, State Chief Examiner, State Senior Deputy Commissioner, State Commissioner, SEC Commissioner, Comptroller of the Currency, Special Counsel, Agency Division Director, Economist, Deputy Regional Administrator, Bank Examiner, OTS Regional Director, Fed Reserve Bank President, Fed Reserve Bank Senior Vice-President/President

Panel F

Public Service positions held in sample

Regulatory agency	Position	Role Description
Federal Reserve	District Representative	Federal Advisory Council
Federal Reserve	Director	Federal Reserve Bank Board of directors
Federal Reserve	Advisor	New England Advisory Council, Community Depository Institution Advisory Council, Business and Community Advisory Council, Industry Councils Committee, Economic Advisory Council, Small Business and Agriculture Advisory Council, Community Depository Institutions Advisory Council, US Treasury and the Foreign Exchange Committee, International Advisory Committee, Investors Advisory Committee on Financial Markets, Advisory Council Small Business and Agriculture, Community Depository Advisory Council, Community Bank Advisory Council, Small Bank Advisory Council Thrift Institution Advisory Council, Consumer Advisory Council
FDIC	Advisor	Advisory Committee on Economic Inclusion
SEC	Advisor	Market Oversight and Financial Services Advisory Committee, Consumer Affairs Advisory Committee, Advisory Committee on Smaller Public Companies

Table 2

Characteristics of Regulatory Connected Banks

This table reports the results of panel OLS regressions examining the relationship between the proportion of a bank board that has connections with regulators and their financial characteristics. The dependent variable (*Con*) is displayed in % and is defined as the number of board members with connections divided by board size. Refer to Appendix A for description of other variables. The sample period is from 2000 to 2013. We estimate the following regression: $Con_{i,t} = \alpha_0 + \sum Controls_{i,t} + \text{Year Dummies} + \varepsilon_{i,t,}$ where ∑Controls is the vector of variables in each column. Bank fixed-effects are used in Column 1-3. A random-effects model is used in columns 4-5. Columns 6-7 are the estimations for the IV-First Stage. All dependent variables in Columns 2 and 4 are lagged. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	FE		RE		IV-1st Stage	
	(1)	(2)	(3)	(4)	(5)	(6)
	Con	Con	Con	Con	Con	Con * Δσv
σv	0.028	0.03	0.036	0.039		
	[0.030]	[0.046]	[0.030]	[0.047]		
Δσv					0.031	-2.155
					[0.100]	[1.335]
BHCAge	0.226***	0.170**	0.073**	0.077**	0.065***	0.035
	[0.074]	[0.085]	[0.037]	[0.039]	[0.014]	[0.073]
Δσv * BHCAge					-0.001	0.300***
					[0.005]	[0.051]
Tier1 Capital	-5.964	1.454	-4.174	1.424	1.64	-12.211
	[5.915]	[6.367]	[4.568]	[4.616]	[3.240]	[19.003]
Bad Loans	-14.475**	-13.989	-15.419**	-15.981*	-31.872***	-15.925
	[6.511]	[9.506]	[6.490]	[9.361]	[7.896]	[33.650]
Lag Enforcement Actions	-0.018	-0.16	-0.003	-0.116	0.408*	0.883
	[0.141]	[0.217]	[0.141]	[0.218]	[0.241]	[1.183]
ROA	-4.694	0.535	-5.203	0.473	-4.913	15.415
	[6.688]	[7.364]	[6.605]	[7.446]	[9.917]	[61.917]
Total Deposits	-2.303	0.796	-2.144	0.783	0.697	3.279
	[2.910]	[3.123]	[2.368]	[2.499]	[1.324]	[4.326]
Total Assets	2.669	2.404	2.641***	2.808***	2.902***	-0.543
	[1.836]	[1.987]	[0.659]	[0.675]	[0.266]	[1.291]
Charter Value	-0.452*	-0.608**	-0.431*	-0.548**	0.04	-0.607
	[0.239]	[0.298]	[0.222]	[0.270]	[0.161]	[0.607]
Asset Growth	0.031	0.16	0.164	0.08	0.317	0.564
	[0.427]	[0.438]	[0.375]	[0.393]	[0.706]	[1.752]
Total Loans	5.033**	5.122**	3.783**	3.241*	-0.187	0.335
	[2.089]	[2.286]	[1.716]	[1.810]	[0.966]	[2.575]
Board Size	-0.068	-0.039	-0.093	-0.067	-0.153***	-0.088
	[0.081]	[0.085]	[0.069]	[0.073]	[0.031]	[0.090]
Board Independence	-0.034	0.47	-0.143	0.376	0.058	0.771
	[1.809]	[1.788]	[1.537]	[1.493]	[0.843]	[2.421]
CEO Tenure	-0.024	-0.036	-0.016	-0.022	0.031**	-0.012
	[0.025]	[0.031]	[0.022]	[0.027]	[0.015]	[0.047]
Duality	0.095	0.37	0.153	0.376	0.213	0.255
	[0.378]	[0.442]	[0.328]	[0.380]	[0.229]	[0.850]
Constant	-18.048	-18.509	-13.032***	-17.521***	-16.189***	6.767
	[11.862]	[13.239]	[4.890]	[5.079]	[2.319]	[10.943]
Observations	3,011	2,539	3,011	2,539	3,011	3,011
Adj. R-squared	0.0917	0.0814	0.1687	0.1696	0.181	0.595
Number of banks	448	411	448	411	448	448
Controls lagged	NO	YES	NO	YES	NO	NO
Bank FE	YES	YES	NO	NO	NO	NO
Year dummy	YES	YES	YES	YES	YES	YES

Table 3

Risk-Discipline and Regulatory Connections; Sensitivity of ΔB/V to Δσv

This table reports the first equation of the Duan et al. (1992) framework using panel OLS regressions and examines the relationship between the sensitivity of changes in leverage to changes in portfolio risk. Refer to Appendix A for description of variables.. The sample period is from 2000 to 2013. We estimate the following regression: $\Delta(B/V)_{i,t} = \alpha_0 + \alpha_1\Delta\sigma_{Vi,t} + \alpha_2\Delta Con_{i,t} + \alpha_3(\Delta\sigma_{Vi,t} * Con_{i,t}) + \sum Controls + Year\ Dummies + \varepsilon_{i,t}$ where ∑Controls is the vector of variables in each column. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)
	ΔLeverage	ΔLeverage	ΔLeverage	ΔLeverage	ΔLeverage
Δσv	-0.016	-0.15	-0.098	-0.098	-0.048
	[0.084]	[0.113]	[0.102]	[0.102]	[0.085]
Con		0.372	-3.297	-3.129	
		[2.514]	[2.246]	[2.189]	
Δσv * Con		2.301***	2.082***	2.077***	
		[0.767]	[0.734]	[0.736]	
ConTenure					-0.057*
					[0.03]
Δσv * ConTenure					0.015***
					[0.005]
Tier1 Capital			-36.857***	-36.219***	-36.900***
			[5.537]	[5.440]	[5.351]
Bad Loans			11.916	11.835	11.929
			[8.568]	[8.554]	[8.603]
Lag Enforcement Actions			0.212	0.21	0.195
			[0.166]	[0.163]	[0.162]
ROA			-23.239*	-23.544*	-22.838**
			[11.954]	[12.046]	[11.619]
Total Deposits			-0.467	-0.199	-0.053
			[1.696]	[1.680]	[1.707]
Total Assets			4.104***	3.969***	3.863***
			[0.995]	[0.994]	[0.994]
Charter Value			-1.906***	-1.948***	-2.012***
			[0.280]	[0.282]	[0.282]
Asset Growth			3.016***	3.011***	3.006***
			[0.444]	[0.434]	[0.439]
Total Loans			4.113***	4.279***	4.197***
			[1.263]	[1.248]	[1.235]
Board Size				-0.025	-0.016
				[0.039]	[0.040]
Board Independence				-1.465	-1.603
				[1.034]	[1.030]
CEO Tenure				0.040***	0.042***
				[0.015]	[0.015]
Duality				0.291	0.246
				[0.227]	[0.243]
Constant	-2.833***	-2.868***	-23.489***	-22.089***	-21.281***
	[0.216]	[0.227]	[7.092]	[7.175]	[7.262]
Observations	3,011	3,011	3,011	3,011	3,011
Adj. R-squared	0.355	0.382	0.5	0.503	0.494
Number of banks	448	448	448	448	448
Bank FE	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES

Table 4

Risk-Shifting and Regulatory Connections: Sensitivity of ΔIPP to Δσv

This table reports the second equation of the Duan et al. (1992) framework using panel OLS/IV/Heckman (1979) regressions and examines the relationship between the sensitivity of changes in the deposit insurance premium to changes in portfolio risk. Refer to Appendix A for description of variables. The sample period is from 2000 to 2013. We estimate the following regression: $\Delta IPP_{i,t} = \beta_0 + \beta_1 \Delta\sigma_{Vi,t} + \beta_2 \Delta Con_{i,t} + \beta_3(\Delta\sigma_{Vi,t} * Con_{i,t}) + \sum\beta Controls_i + \text{Year Dummies} + \varepsilon_{i,t}$ where ∑Controls is the vector of variables in each column. Column 8 is the Heckman (1979) second-stage equation. The selection equation is a probit regression with specifications following Column 1 of Table 2 with dependent variable = 1 if a bank is connected and 0 if otherwise Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	OLS	OLS	OLS	OLS	OLS	IV-2nd Stage	OLS if Con>0	Heckman (1979)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP
Δσv	0.322***	0.257***	0.262***	0.262***	0.287***	0.207***	0.023	0.022
	[0.040]	[0.050]	[0.048]	[0.048]	[0.040]	[0.035]	[0.063]	[0.062]
Con		-0.261	-0.598	-0.535		1.104	-0.265	-0.264
		[0.627]	[0.637]	[0.635]		[2.573]	[1.015]	[0.999]
Δσv * Con		1.124***	1.111***	1.110***		1.855***	2.320***	2.321***
		[0.378]	[0.370]	[0.370]		[0.211]	[0.287]	[0.283]
ConTenure					-0.006			
					[0.01]			
Δσv * ConTenure					0.008***			
					[0.003]			
Tier1 Capital			-2.302	-2.221	-2.544	0.304	-2.119	-2.095
			[2.358]	[2.341]	[2.293]	[1.160]	[2.692]	[2.643]
Bad Loans			11.599***	11.643***	11.504***	8.344***	16.429	16.430*
			[2.707]	[2.670]	[2.705]	[2.227]	[9.945]	[9.779]
Lag Enforcement Actions			0.229***	0.231***	0.225***	0.270***	0.141	0.141
			[0.070]	[0.070]	[0.072]	[0.066]	[0.099]	[0.097]
ROA			-6.566	-6.475	-6.33	-7.422**	-6.036	-6.041
			[4.454]	[4.467]	[4.371]	[3.741]	[5.883]	[5.789]
Total Deposits			0.085	0.154	0.176	-0.025	-0.51	-0.504
			[0.454]	[0.451]	[0.491]	[0.191]	[0.663]	[0.649]
Total Assets			0.858***	0.765***	0.734***	-0.02	0.459	0.458
			[0.232]	[0.236]	[0.236]	[0.098]	[0.513]	[0.504]
Charter Value			-0.189***	-0.193***	-0.217***	-0.035	-0.232***	-0.232***
			[0.059]	[0.059]	[0.060]	[0.032]	[0.084]	[0.083]
Asset Growth			0.133	0.105	0.112	0.212**	0.244	0.243
			[0.088]	[0.088]	[0.090]	[0.090]	[0.176]	[0.173]
Total Loans			0.357	0.374	0.334	-0.028	0.543	0.536
			[0.306]	[0.302]	[0.307]	[0.118]	[0.546]	[0.537]
Board Size				0.014	0.015	0.007	-0.01	-0.011
				[0.010]	[0.010]	[0.006]	[0.014]	[0.014]
Board Independence				-0.289	-0.349	0.058	-0.516	-0.518
				[0.269]	[0.266]	[0.129]	[0.566]	[0.557]
CEO Tenure				0.005	0.006	0.003	0.006	0.006
				[0.005]	[0.005]	[0.003]	[0.005]	[0.005]
Duality				0.151**	0.129*	0.038	0.158	0.158
				[0.074]	[0.077]	[0.036]	[0.131]	[0.129]
Lambda								-0.017
								0.051
Constant	-0.052	-0.061	-5.656***	-5.177***	-4.876***	0.511	-2.428	-1.251
	[0.054]	[0.059]	[1.673]	[1.670]	[1.700]	[0.607]	[3.796]	[3.698]
Observations	3,011	3,011	3,011	3,011	3,011	3,011	948	948
Adj. R-squared	0.55	0.601	0.643	0.645	0.628	0.598	0.785	
Number of banks	448	448	448	448	448	448	156	156
Bank FE	YES	YES	YES	YES	YES	NO	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES	YES	YES
Kleibergen-Paap rk Wald F statistic						10.354		
Stock-Yogo weak ID test critical values: 10% maximal IV size						7.03		

Table 5

Regulatory Connections, Risk-shifting and Bank Payouts and Performance

This table reports the results of panel OLS and logit regressions examining the relationship between connected banks ,risk-shifting, payout and performance. Net Payout is defined as Common Dividends paid out in the year + Net Repurchases (Treasury stock purchase – sales). Net Payout ↑ and Pr (Net Payout ↑) are binary variables that = 1 if the change in the Net Payout increases from the previous year. Buy-Hold Annual rets are calculated using annualized monthly log buy-hold returns. ROA is defined as Income before extraordinary items divided by total assets. Refer to Appendix A for description of variables. Column 3 reports odds ratios from a conditional logit model. Columns 1-3 run regressions for which Net Payout is not 0. The sample period is from 2000 to 2013. Bank fixed-effects are used in all regressions. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	OLS (1)	OLS (2)	Logit (3)	OLS (4)	OLS (5)
	Total Net Payout	Total Net Payout ↑	Pr(Total Net Payout ↑)	Buy-Hold Annual Rets	ROA%
ΔIPP * Con	0.248	0.110***	1.007**	0.077**	0.517**
	[0.868]	[0.042]	[0.004]	[0.039]	[0.226]
ΔIPP	0.599**	-0.016	0.86	-0.021*	-0.174***
	[0.243]	[0.014]	[0.081]	[0.011]	[0.067]
Δσv	-0.179**	-0.013**	0.943**	0.007**	0.030**
	[0.086]	[0.006]	[0.026]	[0.003]	[0.013]
Con	-1.04	0.365	1.013	-0.083	0.239
	[10.321]	[0.356]	[0.018]	[0.250]	[0.807]
Total Assets	24.757***	0.300**	4.647**	-0.642***	-1.127***
	[4.649]	[0.134]	[3.150]	[0.093]	[0.430]
Charter Value	-0.362	0.051	1.002	-0.143***	0.385***
	[1.569]	[0.044]	[0.002]	[0.017]	[0.060]
Asset Growth	-5.229**	-0.579***	0.959***	-0.00003	0.146
	[2.444]	[0.127]	[0.005]	[0.032]	[0.385]
Tier1 Capital	27.611	0.805	0.995	0.353	6.446***
	[29.476]	[1.036]	[0.050]	[0.545]	[2.479]
Total Deposits	3.678	0.163	1.007	0.104	1.099
	[6.602]	[0.276]	[0.013]	[0.182]	[0.902]
Cash	17.569**	0.034	1.001	-0.197	-0.192
	[8.473]	[0.323]	[0.014]	[0.306]	[1.030]
Leverage	-0.723***	0.001	0.987		
	[0.163]	[0.006]	[0.030]		
ROA	26.616	1.011	1.072		
	[22.961]	[1.476]	[0.087]		
Total Loans				-0.393**	-0.542
				[0.154]	[0.548]
Bad Loans				-5.975***	-27.811***
				[0.820]	[3.580]
Noninterest Income				0.233*	0.584
				[0.129]	[0.371]
Constant	-96.940**	-1.826		4.951***	7.067**
	[38.128]	[1.276]		[0.724]	[3.142]
Observations	2,268	2,639	2,491	2,539	2,539
Pseudo/Adj. R-squared	0.314	0.134	0.151	0.482	0.36
Number of banks	393	422	341	411	411
Controls lagged	YES	NO	NO	YES	YES
Bank FE	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES

Table 6

Regulatory Connections and Quid-Pro-Quo

This table reports the second equation of the Duan et al. (1992) framework using panel OLS regressions and examines the relationship between the sensitivity of changes in the deposit insurance premium to changes in portfolio risk. Refer to Appendix A for description of variables. The sample period is from 2000 to 2013. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)
	ΔIPP	ΔIPP	ΔIPP	ΔIPP
Δσv	0.223***	0.224***	0.088	-0.096
	[0.042]	[0.042]	[0.279]	[0.353]
Δσv * Con	1.451***	1.445***	1.512***	6.987**
	[0.268]	[0.261]	[0.280]	[3.501]
Con	0.971	1.468	0.799	-8.423
	[0.812]	[1.026]	[0.719]	[8.745]
State Corruption Score	-0.031	-0.2		
	[1.082]	[0.946]		
Δσv * State Corruption Score	0.049	0.045		
	[0.073]	[0.106]		
Con * State Corruption Score		-1.684		
		[1.534]		
Δσv * Con * State Corruption Score		0.063		
		[0.650]		
State Integrity Index			0.186	-0.145
			[0.531]	[0.438]
Δσv * State Integrity Index			0.051	0.125
			[0.105]	[0.135]
Con * State Integrity Index				3.46
				[3.404]
Δσv * Con * State Integrity Index				-2.236
				[1.452]
Observations	1,931	1,931	2,110	2,110
Adj. R-squared	0.693	0.693	0.682	0.689
Number of banks	298	298	327	327
Bank controls	YES	YES	YES	YES
Constant	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES

Table 7

Public Service, Revolving Doors and Risk-Discipline and Shifting

Column 1-2 and 3-5 of this table reports the first and second equations of the Duan et al. (1992) framework using panel OLS regressions respectively. It examines the sensitivity of changes in the deposit insurance premium and leverage to changes in portfolio risk. Refer to Appendix A for description of variables. The sample period is from 2000 to 2013. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	(1)	(2)	(3)	(4)	(5)
	ΔB/V	ΔB/V	ΔIPP	ΔIPP	ΔIPP
Δσv	-0.059	-0.068	0.279***	0.282***	0.263***
	[0.089]	[0.084]	[0.043]	[0.038]	[0.048]
ConPublicService	-0.549		-0.243		-0.304
	[2.148]		[0.656]		[0.622]
Δσv * ConPublicService	2.054*		1.190**		0.710*
	[1.159]		[0.570]		[0.416]
ConRevolving		-12.264**		-1.421	-1.113
		[4.741]		[2.173]	[1.862]
Δσv * Revolving		4.967***		2.398***	1.889***
		[1.570]		[0.875]	[0.646]
Tier1 Capital	-36.591***	-36.393***	-2.433	-2.384	-2.191
	[5.342]	[5.348]	[2.333]	[2.287]	[2.315]
Bad Loans	12.344	11.551	11.761***	11.560***	11.605***
	[8.609]	[8.535]	[2.679]	[2.687]	[2.667]
Lag Enforcement Actions	0.21	0.167	0.233***	0.212***	0.226***
	[0.161]	[0.166]	[0.069]	[0.073]	[0.072]
ROA	-22.711*	-23.921**	-6.099	-6.69	-6.664
	[12.080]	[11.450]	[4.415]	[4.315]	[4.423]
Total Deposits	-0.201	0.161	0.117	0.305	0.197
	[1.708]	[1.651]	[0.457]	[0.469]	[0.452]
Total Assets	3.870***	3.944***	0.741***	0.776***	0.777***
	[0.999]	[0.962]	[0.236]	[0.226]	[0.230]
Charter Value	-1.951***	-2.029***	-0.195***	-0.226***	-0.203***
	[0.281]	[0.275]	[0.057]	[0.058]	[0.059]
Asset Growth	2.990***	3.061***	0.094	0.129	0.118
	[0.434]	[0.438]	[0.090]	[0.088]	[0.088]
Total Loans	3.982***	4.346***	0.271	0.429	0.413
	[1.289]	[1.228]	[0.304]	[0.312]	[0.293]
Board Size	-0.02	-0.033	0.016	0.01	0.012
	[0.040]	[0.038]	[0.011]	[0.010]	[0.010]
Board Independence	-1.355	-1.728*	-0.228	-0.391	-0.34
	[1.075]	[1.015]	[0.274]	[0.272]	[0.271]
CEO Tenure	0.041***	0.039***	0.006	0.005	0.005
	[0.015]	[0.015]	[0.005]	[0.005]	[0.005]
Duality	0.296	0.233	0.154**	0.144*	0.143**
	[0.227]	[0.234]	[0.076]	[0.075]	[0.072]
Constant	-21.460***	-21.891***	-4.979***	-5.246***	-5.252***
	[7.221]	[7.014]	[1.665]	[1.615]	[1.634]
Observations	3,011	3,011	3,011	3,011	3,011
Adj. R-squared	0.492	0.507	0.626	0.64	0.649
Number of banks	448	448	448	448	448
Bank FE	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES

Table 8

Regulatory Connections and Transfer of Knowledge

This table reports the second equation of the Duan et al. (1992) framework using panel OLS regressions and examines the relationship between the sensitivity of changes in the deposit insurance premium to changes in portfolio risk. Refer to Appendix A for description of variables. Column 1, 2 and 3 show subsample analysis of the main commercial bank under the BHC by their main federal regulator as determined by charter type. Banks in Column 1, 2 and 3 are regulated by the Fed, OCC and FDIC respectively. Column 4 uses the full sample of BHCs. The sample period is from 2000 to 2013. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	Reg by Fed (1)	Reg by OCC (2)	Reg by FDIC (3)	Full BHC Sample (4)
	ΔIPP	ΔIPP	ΔIPP	ΔIPP
Δσv	0.261***	0.326***	0.233***	0.278***
	[0.043]	[0.068]	[0.054]	[0.045]
ConFED	1.985**	-1.748**	0.433	-0.402
	[0.976]	[0.813]	[1.180]	[0.606]
Δσv * ConFED	2.174***	-0.277	0.692	1.132*
	[0.294]	[0.659]	[0.521]	[0.584]
Tier1 Capital	0.041	-1.308	-4.598*	-2.418
	[4.050]	[3.922]	[2.337]	[2.332]
Bad Loans	8.512*	10.199***	13.249***	12.118***
	[4.735]	[3.416]	[3.699]	[2.783]
Lag Enforcement Actions	0.419***	-0.009	0.282**	0.233***
	[0.153]	[0.063]	[0.123]	[0.070]
ROA	-14.974	-11.873	-0.521	-6.104
	[10.480]	[9.096]	[5.175]	[4.413]
Total Deposits	-0.225	-0.076	1.043*	0.136
	[0.878]	[0.775]	[0.622]	[0.457]
Total Assets	0.944*	0.205	1.232***	0.749***
	[0.482]	[0.575]	[0.252]	[0.235]
Charter Value	-0.11	-0.280**	-0.255***	-0.197***
	[0.098]	[0.112]	[0.071]	[0.057]
Asset Growth	0.252*	-0.099	0.102	0.101
	[0.145]	[0.241]	[0.129]	[0.090]
Total Loans	0.912	0.08	0.593	0.329
	[0.830]	[0.546]	[0.409]	[0.311]
Board Size	0.022	-0.013	0.030**	0.015
	[0.025]	[0.019]	[0.014]	[0.011]
Board Independence	-0.873	0.007	-0.314	-0.236
	[0.554]	[0.436]	[0.384]	[0.273]
CEO Tenure	0	0.007	0.009	0.005
	[0.007]	[0.007]	[0.008]	[0.005]
Duality	0.038	0.121	0.226**	0.162**
	[0.200]	[0.113]	[0.109]	[0.077]
Constant	-6.107*	-0.912	-8.004***	-5.070***
	[3.487]	[4.227]	[1.802]	[1.659]
Observations	652	874	1,485	3,011
Adj. R-squared	0.797	0.646	0.501	0.624
Number of banks	107	129	246	448
Bank FE	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES

Table 9

Market Discipline and Regulatory Connections

Panel A and B of this table reports the first and second equations of the Duan et al. (1992) framework using panel OLS regressions respectively. It examines the sensitivity of changes in the deposit insurance premium and leverage to changes in portfolio risk. Refer to Appendix A for description of variables. Columns 1-3 show the full sample of BHCs. Columns 4-6 show the sample of small BHCs with assets below the median while Columns 7-9 uses large BHCs with assets above the median. The sample period is from 2000 to 2013. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

Panel A	All BHC	All BHC	All BHC	Small BHC	Small BHC	Small BHC	Large BHC	Large BHC	Large BHC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ΔB/V	ΔB/V	ΔB/V	ΔB/V	ΔB/V	ΔB/V	ΔB/V	ΔB/V	ΔB/V
Δσv	-0.009	-0.108	-0.124	-0.099	-0.231*	-0.232*	0.046	-0.014	-0.034
	[0.095]	[0.106]	[0.107]	[0.147]	[0.133]	[0.134]	[0.083]	[0.115]	[0.123]
Sub Debt	0.332	0.728	0.798	6.303	6.292	6.43	-2.573	-2.119	-2.105
	[2.753]	[2.667]	[2.694]	[5.147]	[5.038]	[5.070]	[2.223]	[2.215]	[2.168]
Δσv * Sub Debt	0.85	0.34	0.995	-3.538*	-3.228*	-2.911	0.777	0.338	0.923
	[0.867]	[0.604]	[0.751]	[1.846]	[1.709]	[2.281]	[0.789]	[0.598]	[0.795]
Con		-3.113	-3.298		-2.347	-2.321		-1.828	-1.95
		[2.124]	[2.055]		[4.263]	[4.249]		[2.298]	[2.249]
Δσv * Con		2.029**	2.250**		2.713**	2.729**		1.429*	1.745**
		[0.767]	[0.775]		[1.071]	[1.078]		[0.757]	[0.852]
Δσv * Con * Sub			-6.352			-9.091			-5.812
			[7.957]			[23.836]			[7.799]
Observations	3,011	3,011	3,011	1,506	1,506	1,506	1,505	1,505	1,505
Adj. R-squared	0.482	0.503	0.504	0.493	0.517	0.516	0.51	0.521	0.522
Number of banks	448	448	448	317	317	317	209	209	209
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B	All BHC	All BHC	All BHC	Small BHC	Small BHC	Small BHC	Large BHC	Large BHC	Large BHC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP	ΔIPP
Δσv	0.312**	0.258**	0.250**	0.266**	0.197**	0.195**	0.327**	0.293**	0.285**
	[0.047]	[0.050]	[0.051]	[0.074]	[0.067]	[0.068]	[0.038]	[0.054]	[0.057]
Sub Debt	0.06	0.212	0.247	0.449	0.445	0.631	0.368	0.557	0.562
	[0.640]	[0.655]	[0.625]	[0.566]	[0.555]	[0.564]	[0.690]	[0.762]	[0.706]
Δσv * Sub Debt	0.404	0.136	0.455	-1.47**	-1.31**	-0.881	0.469	0.223	0.459
	[0.448]	[0.304]	[0.376]	[0.631]	[0.570]	[0.665]	[0.401]	[0.296]	[0.389]
Con		-0.521	-0.612		-0.775	-0.74		-0.222	-0.271
		[0.619]	[0.598]		[1.274]	[1.275]		[0.631]	[0.612]
Δσv * Con		1.090**	1.198**		1.421**	1.443**		0.815**	0.943**
		[0.387]	[0.391]		[0.528]	[0.524]		[0.383]	[0.429]
Δσv * Con * Sub			-3.097			-12.25*			-2.35
			[3.883]			[6.444]			[3.788]
Observations	3,011	3,011	3,011	1,506	1,506	1,506	1,505	1,505	1,505
Adj. R-squared	0.599	0.645	0.647	0.398	0.477	0.478	0.694	0.716	0.717
Number of banks	448	448	448	317	317	317	209	209	209
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 10

Too-Big-To-Fail and Regulatory Connections

This table reports the second equation of the Duan et al. (1992) framework using panel OLS regressions and examines the relationship between the sensitivity of changes in the deposit insurance premium to changes in portfolio risk. Refer to Appendix A for description of variables. Columns 1-3 excludes banks with the top 5%, 10% and 20% assets as at end of 2007. The sample period is from 2000 to 2013. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	Excl Top 5%Assets (1) ΔIPP	Excl Top 10%Assets (2) ΔIPP	Excl Top 20%Assets (3) ΔIPP	Ctrl Top 5%Assets (4) ΔIPP	Ctrl Top 10%Assets (5) ΔIPP	Ctrl Top 20%Assets (6) ΔIPP	Top 5% & Connect (7) ΔIPP
Δσv	0.275***	0.269***	0.210***	0.261***	0.258***	0.214***	0.265***
	[0.047]	[0.050]	[0.043]	[0.049]	[0.051]	[0.038]	[0.049]
Con	-1.17	-0.912	-1.081	-0.511	-0.486	-0.327	-0.196
	[0.748]	[0.820]	[0.824]	[0.619]	[0.609]	[0.620]	[0.622]
Δσv * Con	1.002**	1.025**	1.361***	1.076***	1.054**	1.126***	0.987**
	[0.434]	[0.449]	[0.366]	[0.403]	[0.411]	[0.390]	[0.463]
Δσv * Top5%Asset				0.032			-0.195***
				[0.073]			[0.065]
Δσv * Top10%Asset					0.051		
					[0.069]		
Δσv * Top20%Asset						0.112*	
						[0.058]	
Δσv * Con * Top5%Asset						1.506**	
							[0.629]
Tier1 Capital	-5.212**	-5.029**	-3.560*	-2.198	-2.273	-2.115	-2.16
	[2.084]	[2.125]	[2.042]	[2.342]	[2.330]	[2.296]	[2.331]
Bad Loans	10.071***	10.790***	12.113***	11.612***	11.607***	11.399***	11.404***
	[2.593]	[2.680]	[2.715]	[2.665]	[2.672]	[2.701]	[2.634]
Lag Enforcement Actions	0.274***	0.287***	0.230**	0.235***	0.240***	0.238***	0.224***
	[0.090]	[0.098]	[0.102]	[0.071]	[0.070]	[0.070]	[0.069]
ROA	-5.958	-4.471	-5.882	-6.539	-6.327	-7.054	-6.487
	[4.720]	[4.693]	[5.416]	[4.463]	[4.378]	[4.482]	[4.438]
Total Deposits	0.587	0.619	0.693	0.127	0.111	0.102	0.214
	[0.465]	[0.490]	[0.527]	[0.448]	[0.450]	[0.452]	[0.448]
Total Assets	1.024***	0.963***	0.881***	0.761***	0.758***	0.760***	0.738***
	[0.233]	[0.244]	[0.291]	[0.235]	[0.236]	[0.232]	[0.238]
Charter Value	-0.230***	-0.242***	-0.195***	-0.188***	-0.183***	-0.149***	-0.207***
	[0.069]	[0.075]	[0.061]	[0.062]	[0.063]	[0.053]	[0.059]
Asset Growth	0.098	0.078	0.087	0.108	0.111	0.127	0.102
	[0.094]	[0.097]	[0.087]	[0.089]	[0.089]	[0.082]	[0.089]
Total Loans	0.628*	0.805**	0.672**	0.38	0.384	0.436	0.352
	[0.322]	[0.323]	[0.328]	[0.298]	[0.299]	[0.298]	[0.298]
Board Size	0.016	0.022*	0.029**	0.014	0.015	0.015	0.011
	[0.011]	[0.012]	[0.012]	[0.010]	[0.010]	[0.010]	[0.010]
Board Independence	-0.455	-0.411	-0.318	-0.296	-0.299	-0.252	-0.311
	[0.286]	[0.302]	[0.320]	[0.268]	[0.267]	[0.254]	[0.268]
CEO Tenure	0.008	0.008	0.008	0.006	0.006	0.006	0.005
	[0.006]	[0.006]	[0.007]	[0.005]	[0.005]	[0.005]	[0.005]
Duality	0.099	0.101	0.073	0.144**	0.137*	0.132*	0.149**
	[0.076]	[0.084]	[0.091]	[0.071]	[0.072]	[0.073]	[0.072]
Constant	-6.273***	-6.077***	-5.931***	-5.135***	-5.104***	-5.236***	-4.979***
	[1.571]	[1.641]	[1.921]	[1.660]	[1.663]	[1.664]	[1.686]
Observations	2,484	2,302	1,975	3,011	3,011	3,011	3,011
Adj. R-squared	0.636	0.64	0.61	0.645	0.646	0.66	0.649
Number of banks	300	284	252	448	448	448	448
Bank FE	YES	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES	YES

Table 11

Regulatory Fixed-Effects

This table reports the second equation of the Duan et al. (1992) framework using panel OLS regressions and examines the relationship between the sensitivity of changes in the deposit insurance premium to changes in portfolio risk. Refer to Appendix A for description of variables. The sample period is from 2000 to 2013. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	(1)	(2)	(3)
	ΔIPP	ΔIPP	ΔIPP
Δσv	0.396***	0.286***	0.242*
	[0.077]	[0.032]	[0.139]
Con		-0.472	-0.287
		[0.620]	[0.544]
Δσv * Con		1.063***	1.150***
		[0.298]	[0.289]
RegbyFDIC	0.097	0.09	
	[0.114]	[0.101]	
RegbyOCC	0.003	0.032	
	[0.128]	[0.119]	
Δσv * RegbyFDIC	-0.128	-0.062	
	[0.085]	[0.046]	
Δσv * RegbyOCC	-0.077	-0.003	
	[0.096]	[0.075]	
Δσv * FedDistrict 2			0.025
			[0.155]
Δσv * FedDistrict 3			-0.259*
			[0.140]
Δσv * FedDistrict 4			0.078
			[0.152]
Δσv * FedDistrict 5			-0.001
			[0.148]
Δσv * FedDistrict 6			-0.198
			[0.145]
Δσv * FedDistrict 7			0.157
			[0.168]
Δσv * FedDistrict 8			-0.203
			[0.140]
Δσv * FedDistrict 9			-0.191
			[0.138]
Δσv * FedDistrict 10			-0.191
			[0.154]
Δσv * FedDistrict 11			-0.206
			[0.148]
Δσv * FedDistrict 12			0.065
			[0.147]
Constant	-4.654***	-5.105***	-5.140***
	[1.712]	[1.702]	[1.672]
Observations	3,011	3,011	3,011
Adj. R-squared	0.608	0.648	0.696
Number of banks	448	448	448
Bank controls	YES	YES	YES
Bank FE	YES	YES	YES
Year dummy	YES	YES	YES

Table 12

Financial Crisis, Worst performing banks and Data Start Date

This table reports the second equation of the Duan et al. (1992) framework using panel OLS regressions and examines the relationship between the sensitivity of changes in the deposit insurance premium to changes in portfolio risk. Refer to Appendix A for description of variables. Column 1 excludes years 2007 and 2008. Column 2 excludes the bottom 20% banks as ranked by ROA. Column 3 uses data from 2004 to 2013. Estimations of IPP and σv in Column 4 are calculated as in Duan (1994). The sample period is from 2000 to 2013 in Columns 1-3 and 2003 to 2008 in Column 4. Bank fixed-effects are used in all columns. Standard errors are clustered at the bank level and are reported in parenthesis. ***, ** and * indicate significance level at the 1, 5 and 10% respectively.

	Exclude Crisis Years 07-08 (1)	Exclude Bottom 20% ROA (2)	Data Start Year 2004 (3)	Duan (1994) Max. Likelihood estimations of IPP & σv (4)
	ΔIPP	ΔIPP	ΔIPP	ΔIPP
Δσv	0.276***	0.203**	0.278***	0.0004
	[0.050]	[0.103]	[0.047]	[0.0001]
Con	-0.181	-0.713	-0.979	-0.394
	[0.710]	[0.567]	[0.717]	[0.954]
Δσv * Con	1.085***	1.462***	1.137***	0.015**
	[0.373]	[0.532]	[0.331]	[0.006]
Tier1 Capital	-2.095	-2.638	-5.195**	-10.244***
	[2.682]	[1.663]	[2.084]	[3.665]
Bad Loans	11.288***	3.382	9.730***	-3.564
	[3.400]	[2.587]	[2.464]	[2.411]
Lag Enforcement Actions	0.079	0.02	0.218***	-0.116*
	[0.058]	[0.034]	[0.071]	[0.060]
ROA	-9.062	-11.196	-6.026	-0.622
	[5.886]	[7.041]	[4.474]	[2.079]
Total Deposits	-0.36	-0.624*	0.759	-0.175
	[0.501]	[0.351]	[0.478]	[0.620]
Total Assets	0.671***	0.591***	0.959***	-0.613
	[0.254]	[0.225]	[0.283]	[0.612]
Charter Value	-0.063	-0.083	-0.329***	-0.102
	[0.058]	[0.052]	[0.079]	[0.087]
Asset Growth	0.241*	-0.006	0.082	-0.467*
	[0.140]	[0.107]	[0.090]	[0.262]
Total Loans	0.362	0.292	0.734**	1.035
	[0.328]	[0.285]	[0.333]	[0.825]
Board Size	0.018	0.001	0.009	-0.011
	[0.011]	[0.010]	[0.011]	[0.016]
Board Independence	-0.274	-0.157	-0.407	-0.628
	[0.323]	[0.208]	[0.337]	[0.599]
CEO Tenure	0.006	0.001	0.005	0.0005
	[0.005]	[0.002]	[0.006]	[0.007]
Duality	0.124	0.074	0.142	0.167
	[0.077]	[0.059]	[0.088]	[0.127]
Constant	-3.542**	-3.154**	-6.454***	5.36
	[1.703]	[1.514]	[2.023]	[4.145]
Observations	2,423	2,408	2,718	299
Adj. R-squared	0.681	0.684	0.675	0.271
Number of banks	445	423	441	74
Bank FE	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES

Appendix A

Variable Definitions and Sources

Variable	Definitions	Source(s)
Financial variables		
σv%	The volatility of asset returns (annualized) in % as described in Appendix B	CRSP, FR Y9-C
IPP%	The fair value of the deposit insurance premium in % as described in Appendix B	CRSP, FR Y9-C
B	Book value of total liabilities	FR Y9-C
V	Market value of total assets	CRSP, FR Y9-C
σE	The volatility of monthly equity returns (annualized)	CRSP
E	The number of shares outstanding times the share price on the last day of the trading year	CRSP, FR Y9-C
Leverage (B/V%)	Book value of liabilities / Market value of assets in %	FR Y9-C
Tier1 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
Total Assets	Natural logarithm of the book value of total assets	FR Y9-C
Charter Value	Market value equity at year end / Book value of equity at year end	CRSP, FR Y9-C
Asset Growth	Change in total assets from previous year	FR Y9-C
Total Loans	Total Loans / Total Assets	FR Y9-C
Top5%Asset, Top10%Asset, Top20%Asset	A dummy variable that = 1 if the bank is placed in the top 5,10 or 20% of the book value of assets at 2007 and 0 if otherwise	FR Y9-C
Sub Debt	The book value of subordinated debt divided by the sum of subordinated debt and Tier1 Capital	FR Y9-C
Cash	Cash / Total Assets	FR Y9-C

Buy-Hold Annual Rets	Summation of [1+Log Monthly Buy-hold Returns for the 12 months of the year] -1	CRSP
Noninterest Income	Noninterest Income / (Interest income + Noninterest Income)	FR Y9-C
Payout variables		
Net Payout	(Common dividends + Net Repo) / Book value of equity	FR Y9-C
Div	Common dividends / Book value of equity	FR Y9-C
Net Repo	(Treasury stock purchase – Treasury stock sales) / Book value of equity	FR Y9-C
Pr(Net Payout ↑) & (Net Payout ↑)	A dummy variable that = 1 if the change in Net Payout from the previous year is positive and 0 if otherwise	FR Y9-C
Board variables		
Board Size	Total number of board members	BoardEx
Board Independence	Total number of directors that are classified as independent / Board Size	BoardEx
CEO Tenure	Number of years the CEO has been on the board of directors	BoardEx
Duality	A dummy variable that = 1 if the CEO is also the Chairman and 0 if otherwise	BoardEx
Bank structure variables		
RegbyFDIC	A dummy variable that = 1 if the main bank subsidiary under the BHC is regulated by the FDIC and 0 if otherwise	Commercial Bank Call Report
RegbyOCC	A dummy variable that = 1 if the main bank subsidiary under the BHC is regulated by the OCC and 0 if otherwise	Commercial Bank Call Report
Enforcement Actions	Total number of enforcement actions issued by the Fed, FDIC, OCC and State regulators to a BHC or it's subsidiaries	Regulatory websites
BHCAge	Age (in years) of the BHC	FR Y9-C
Connection variables		
Con	Total number of directors that has formally worked or served in the Fed, FDIC, OCC, SEC, and State regulators divided by board size	BoardEx, regulatory body websites and annual reports, Linkedin, news articles
ConPublicService	The total number of board members that have held in public service capacities at any of the above mentioned regulatory bodies divided by board size. We define a position as public service if the regulatory position is typically held by directors who are employed full time by a bank and typically consists of	BoardEx, regulatory body websites and annual reports, Linkedin, news articles

	advisory councils as well as federal reserve board of director positions.	
ConRevolving	The total number of board members have held full time employment at any of the above defined regulatory bodies divided by board size	BoardEx, regulatory body websites and annual reports, Linkedin, news articles
ConFED	The total number of board members in both public service and full time employment capacities at the Fed divided by board size	BoardEx, regulatory body websites and annual reports, Linkedin, news articles
ConTenure	The total number of years that all connected directors of the bank board (defined in Con) spent in the regulatory agencies	BoardEx, regulatory body websites and annual reports, Linkedin, news articles
<u>State variables</u>		
State Corruption Score	Normalised score from a survey of State House reporters in 2003 on the level of corruption in their respective states	Boylan and Long (2003)
State Integrity Index	State level index in 2008 created by the Better Government Association for which aggregates measure of freedom of information laws, whistle-blower protection laws, campaign finance laws, open meeting laws and conflict of interest laws	Better Government Association
FedDistrict 1 to 12	The Federal Reserve district that the BHCs are geographically located in.	FR Y9-C

Appendix B

Estimation of σ_V, V and IPP

We follow Ronn and Verma (1986), Duan, Moreau and Sealey (1992) and Bushman and Williams (2012) in estimating the 2 unobservables σ_V and V required as inputs to compute the insurance premium (IPP). We obtain values for both σ_V (volatility of asset returns) and V (market value of assets) by through solving an iterative process of 2 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:

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

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

E is the market value of equity. *N*() is the cumulative density of a standard normal variable. *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. It is set to 0.97 following previous research (Ronn and Verma, 1986; Hovakimian, Kane and Laeven, 2003; Bushman and Williams, 2012) which allows the asset value of a bank to deteriorate to 97% of debt before the option is exercised. B is the book value of liabilities. T is the time to maturity of the option and is set to 1 on the assumption that the next audit occurs in 1 year where the option is re-priced following changes in the financial parameters.

From Ito's lemma:

$$\sigma_E = (VN(X)\sigma_V) / (E) \quad \text{(B)}$$

where σ_E is the standard deviation of the returns of equity volatility. Equation (B) is the instantaneous standard deviation of the return on E and is the optimal hedge equation that relates the volatility of bank equity returns to bank asset returns. A Newton search algorithm then obtains annual estimates of σ_V and V by simultaneously solving equations (A1) and (B) in an iterative process.

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

$$IPP = N(y + \sigma_V\sqrt{T}) - (1- \delta)^n(V/B)N(y) \quad (C1)$$

$$\text{where } y \equiv ((\ln(B/V(1- \delta)^n) - (\sigma^2_V T/2)) / (\sigma_V\sqrt{T}) \quad (C2)$$

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