Do Capital Standards Promote Bank Safety? Evidence from Involuntary Recapitalizations

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Regulators demand that weakly capitalized banks raise additional capital with the goal of reducing the public's exposure to bank risk-taking. This paper finds that involuntary bank equity issues during 1995-2008 are associated with significantly negative announcement returns. These negative returns are greatest when the option value of the government's deposit guarantee is most greatly reduced. Consistent with the regulator's policy goal, this implies a wealth transfer from the bank's equity holders to the deposit insurer. However, it is also found that the negative returns are strongly related to the dilution of the insider owners' equity stake. This suggests insider moral hazard may be exacerbated by the equity issue. Consistent with this notion, subsequent declines in operating performance and survival rates are also found to be strongly related to declines in the insider's ownership position. This suggests that capital standards, to some degree, shift bank failure risk from the near term to future periods.

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1. Introduction

The last financial crisis uncovered substantial governmental exposure to bank liabilities, with losses provoking stricter regulations, including limits on risk-taking and higher capital standards. Deposit insurance skews shareholders towards greater risk-taking but higher capital mitigates this by reducing taxpayer exposure to failure risk.[1]

Banks raising equity also increase moral hazard problems through traditional agency effects [see Jensen and Meckling (1976)]. Besanko and Kanatas (1996) show that higher capital standards increase bank risk by diluting the shareholdings of insider-managers, weakening their incentives to act in the broader interests of all shareholders, and leading to lower operating efficiency, reduced profitability, and higher probability of failure in future. Involuntary capital increases pose two countervailing incentive effects. They reduce both banks' risk-shifting (welfare-positive) and inside-owners' wealth maximization (welfare-negative). Both effects reduce shareholders' equity. Recapitalizations have negative announcement effects driven by two factors[2] – devaluation of deposit insurance and reduction in future operating profits, due to insider dilution.

This paper investigates banks' involuntary equity issues, their announcement effects and subsequent performance. First, negative announcement returns that vary directly with changes in deposit insurance values and insider shareholding are hypothesized. Second, if the negative announcement effect is driven by weakened insider incentives, then subsequent operating performance should exhibit deterioration that varies directly with the change in insider shareholding. This paper reports empirical results consistent with these hypotheses.

This paper makes several contributions that go beyond previous research. First, it verifies Besanko and Kanatas (1996) who predict decreases in involuntary issuers' efficiency, by finding significant declines after 4 years. It also finds a strong relation between the degree of insider dilution and announcement returns. Second, this paper finds that banks with the smallest post-issue insider holdings experience the greatest declines in overall efficiency and that greater dilution decreases survival likelihood. Third, this paper shows that deposit insurance option value (scaled by deposits) decrements are associated with more negative announcement returns. Fourth, this paper corroborates efficiency declines on traditional financial accounting measures[3] using a non-parametric summary statistic called data envelopment analysis (DEA).

Relative to voluntary equity issues, involuntary recapitalizations should be free of informational asymmetries and uncontaminated by market timing. Consistent with this and Cornett et al. (1998), this paper finds no evidence of pre-issue price

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[1] Higher capital standards may not always reduce asset substitution. Diamond and Rajan (2000), Blum (1999), Calem and Rob (1999) theorize about this and Furlong (1988), Gennotte and Pyle (1991), Sheldon (1996), Barth et al. (2004, 2006) offer empirical support. Berger et al. (1995) argue that higher bank capital resolves agency issues between creditors and shareholders but worsens those between managers and shareholders.

[2] Equity announcements usually have negative announcement effects due to the 'lemons' problem [see Myers and Majluf (1984)]. However, involuntary issues should suffer less from this than voluntary issues.

[3] Traditional proxies for operating performance include non-interest expense/total income, net charge-offs/loans, loan allowance/loans, and assets/employee.

appreciation or market timing for involuntary issues.

Capital standards reduce risk-shifting incentives and protect taxpayers. When implemented via forced recapitalizations that dilute insider ownership, they also exacerbate insider moral hazard, weakening bank performance and increasing long term failure risk. While the benefits of capital regulation are well known, this paper illuminates a potential cost of such policies: capital standards reduce failure risk by merely shifting it from the near term to future periods.

2. Related Literature

2.1 The Nature of Involuntary Bank Capital Issues

This paper uses trigger capital ratios from the US Prompt Corrective Action (PCA) rules to classify issues as involuntary. The regulator also uses CAMEL ratings, which are unavailable for analysis. From 1997-2005, most of this paper's sample period, well-capitalized banks paid no premiums for deposit insurance coverage, providing them with a strong incentive to stay healthy by raising capital as needed.

Banks, arguably, exhaust options such as dividend curtailment before raising capital. This paper finds a substantial spike in payout ratios in the year before the issue[4], suggesting the opposite. Although Krishnan et al. (2010) find evidence of reduced pre-SEO payout, their sample is much smaller[5]. This paper finds that large payouts precede SEOs implying that insiders maximize surplus extraction in anticipation of dilution[6].

Another criticism is that PCA rules are not enforced on bank holding companies (BHCs) as strictly as with banks. Most BHCs were undercapitalized during the sample period, implying immunity to regulatory pressure to recapitalize. However, BHCs comprise only 13% of this sample[7]. The results from this paper are validated, and occasionally strengthened, with controls for BHC/bank status and the analysis of bank-only samples.

Finally, if the story in this paper holds, both stock and bond returns for capital issuing banks/BHCs should be negative. BHCs are more likely than banks to meet capital requirements with bonds[8] but there was insufficient data[9] for analysis.

2.2 Voluntary vs. Involuntary Bank Capital Issues: Announcement Returns

Keeley (1989) finds a negative effect for involuntary stock issues by BHCs, but none for voluntary issues. In contrast, Cornett and Tehranian (1994) and Cornett et

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[4] See Appendix 2.

[5] This paper has 75 observations to their 15.

[6] See Appendix 3. This paper's results are robust to all specifications of the payout ratio.

[7] Based on their status at the time of the SEO; 25% if post-SEO status is also considered.

[8] After 1996, BHCs met their Tier I capital requirements chiefly by issuing Trust Preferred Securities (TruPS) – hybrid instruments with tax deductible dividends that count towards BHC Tier I capital. In contrast, banks cannot count TruPS as Tier I capital and do not issue these securities.

[9] Bond pricing data from the TRACE database could be located for only 2 out of 75 issuers in this sample.

al. (1998) find a negative but insignificant announcement effect for involuntary issues and a significant negative effect for voluntary issues.[10] Krishnan et al. (2010) find robust evidence of significantly negative announcement returns for both types of issues.

Krishnan et al. (2010) find significantly negative market reactions to involuntary issues by banks with recent stock price appreciation, with announcement returns becoming more adverse as banks approach distress. They conclude that opportunism and reduced asset substitution incentives both contribute to the negative announcement effect of involuntary issues.

This paper hypothesizes that moral hazard also contributes to the negative announcement return. Cornett and Tehranian (1994) find that the smallest pre-issue ownership stakes of involuntary issuers are associated with the most negative announcement period returns.

2.3 Voluntary vs. Involuntary Bank Capital Issues: Post-Issue Operating Performance

If the market discounts stock prices to reflect reduced insider incentives following forced recapitalizations, operating performance should deteriorate subsequently. Cornett et al. (1998) find no such evidence in the operating or stock performance, buy-and-hold returns, or quarterly earnings announcement returns of involuntary issuers, relative to benchmark firms, in the 3 years post-issue. Krishnan et al. (2010) report an insignificant outperformance of involuntary over voluntary issuers over the same horizon but do not test for post-issue performance deterioration. They find that involuntary issuers earn positive but insignificant 3-year buy and hold excess returns[11] and significant positive values for the average return on assets and net charge-offs/loans ratios.

The evidence from prior literature is thus ambiguous. While Cornett et al. (1998) fail to find evidence of deterioration, Krishnan et al. (2010) focus on comparisons of voluntary and involuntary issuers rather than on the post-issue trend for the involuntary issuers. This paper contributes to this literature firstly by examining post-issue operating performance among involuntary issuers and relating efficiency to insider ownership, and secondly, by utilizing a multi-dimensional measure of efficiency in addition to traditional accounting measures.

2.4 Data Envelopment Analysis

This paper employs data envelopment analysis (DEA), a non-parametric, linear programming method for assessing homogeneous business units with multiple inputs and outputs, pioneered by Charnes et al. (1978). DEA scores over parametric techniques by not requiring assumptions about the underlying production frontier

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[10] Their finding on voluntary capital issues is anticipated by Ross (1977) and Myers and Majluf (1984), who predict that firms issue equity when it is overvalued by the market. The decision to issue reveals this information, consequently eliciting a negative market reaction.

[11] Excess returns are calculated with reference to the Fama-French/Momentum 4-factor model.

and has been applied to address various banking questions.[12] Several researchers have conducted event studies in efficiency using DEA, as this paper does. Avkiran (1999) studies efficiency in Australian bank mergers and finds that while acquirers are more efficient than targets, they do not always maintain their pre-merger efficiency. Among US banks, Kohers et al. (2000) find that the acquirer's event abnormal returns vary negatively with the target's efficiency and positively with the difference in efficiencies between the acquirer and target. Havrylchyk (2006) and Sturm and Williams (2004) have examined how foreign ownership impacts efficiency using DEA in Poland and Australia, respectively.

DEA specifications cover two broad ideas of bank function – production or intermediation. In the producer model, transactions (loans and deposits) are outputs and fixed assets, interest expenses, and non-interest expenses are inputs. Production-type specifications are appropriate for branch-level efficiency analysis. Intermediation-type specifications, in which banks convert deposits (inputs) into loans and investments (outputs) with associated costs (inputs), are better suited to studies of overall bank efficiency. This paper builds on Sealey and Lindley (1977), with a variant of the intermediation-type specification, including interest and non-interest expenses, net charge-offs and insider loans as costs. Assaf et al. (2011) use a similar specification. Net charge-offs and insider loans provide insights into insider agency issues, as in Banker et al. (2010) who find a negative relation between the non-performing loans ratio and productivity.

2.5 Regulation and Bank Risk Taking

Historically, deposit insurance aimed to mitigate the welfare costs of bank runs. Despite these costs, Calomiris and Kahn (1991) and Diamond and Rajan (2001) argue that monitoring by skittish depositors provides valuable discipline for bank owners. Deposit insurance, especially if underpriced, implicitly subsidizes bank shareholders and incentivizes riskier asset choices, introducing moral hazard between shareholders and the deposit insurer/uninsured depositors.

While incomplete deposit insurance reduces asset substitution, regulators usually augment this with capital requirements. Estrella (2004), Hellmann et al. (2000), Repullo (2004) and Repullo and Suarez (2004) analyze capital requirements under various deposit markets and generally agree that they reduce risk-taking. In Flannery (1991), the FDIC's mispricing errors (measured by the put option value of the deposit insurance guarantee) decrease with capital. However, Blum (1999) and Calem and Rob (1999) show how capital requirements can increase risk in multi-period settings while Diamond and Rajan (2000) show that capital requirements can increase the chance of a run.

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[12] Banker et al. (2010) measure Korean bank productivity with DEA and find a positive relation with capital adequacy, similar to the positive relation in this paper between post-involuntary issue insider holding and subsequent changes in efficiency. Azofra and Santamaria (2010) find an inverse relation with the gap between the ultimate controlling owner's cash flow and control rights, for Spanish banks.

The idea that capital regulation may increase risk is supported empirically by Gennotte and Pyle (1991) who find that accounting-based standards increase bank risk and Barth et al. (2004, 2006) who find that higher capital norms are associated with fewer non-performing loans but are not robustly related to the likelihood of a banking crisis.

2.6 Bank Ownership Structure and Corporate Governance

This paper is part of a larger literature linking ownership structure and corporate governance in financial institutions. Saunders et al. (1990) find that owner-controlled banks exhibit greater risk-taking than manager-controlled banks with smaller ownership stakes. Laeven and Levine (2009) find that banks with stronger owners take greater risks and that capital regulations' impact on risk varies with ownership concentration. These studies address the conflict between owners and non-owner managers. In contrast, this paper addresses concentrated versus diluted ownership structures and finds that capital standards mitigate agency problems between shareholders and the deposit insurer/uninsured creditors but create new problems between inside and outside owners.

Sundaram and Yermack (2007) argue that CEOs' risk-shifting propensities are moderated as their firms' and personal[13] debt-to-equity ratios converge. In this context, capital issues would dampen risk-shifting, and not increase it by diluting insiders as predicted by this paper. However, while the excess of firm over CEO leverage in their study is 0.40, the disparity is vastly greater for the sample of banks in this paper[14], muting any beneficial effects on risk-shifting. Sundaram and Yermack also do not consider insider dilution, a major risk determinant here. Further, this paper finds that total insider compensation (including salary, bonus and the value of options exercised) represents only 38% of the potential change in the market value of insider equity resulting from dilution[15]. While the sample for this metric is too small for robust conclusions, these arguments underline the insider agency problem and suggest that firm-CEO relative leverage effects are not influential in the context of this paper.

3. Data and Methodology

3.1 Sources of Data

Bank financial statement data including risk-weighted capital measures and off-balance sheet items are available online from 'Call Reports' filed by all regulated banks[16]. This data is annual from 1992 and quarterly after 2002. Data on insider holdings, stock issuance, and share prices and returns were obtained from the SEC's

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[13] The inside debt of CEOs is calculated as the actuarial value of their pension plans and their inside equity is based on their share and option ownership.

[14] CEOs' personal leverage may be assumed to be the same for both samples but bank leverage ratios are typically 9 or more, in contrast to 0.57 for the industrial firms in their sample.

[15] See Appendix 1

[16] BHCs file Y-9 reports.

online proxy filings, SDC, and CRSP daily databases respectively. The Compustat ExecuComp database provided executive compensation data. KBW Bank Index (ticker BKX) daily returns were downloaded from Yahoo Finance. Economic data were obtained from the website of the Federal Reserve Bank of St. Louis (FRED). The Basel I norms came into gradual effect during 1989-92, but data availability limits the sample period to 1995-2008.

This paper considers SEOs by insufficiently capitalized banks as involuntary offerings. Basel I established minimum capital standards of 4% for the Tier I risk based capital ratio, 8% for the total risk based capital ratio, and 4% for the Tier I leverage ratio. Banks usually recapitalize before the minimum thresholds, as specified in the PCA rules. Following Krishnan et al. (2010), equity issues are classified as involuntary for institutions not "well-capitalized" under the following PCA rules: (i) Tier I risk based capital ratio ≤ 6%, (ii) Total risk based capital ratio ≤ 10%, or, (iii) Tier I leverage ratio ≤ 6%. If any of these conditions is met, at any time, in the window $[t - 3, t + 1]$ for an equity issue in year t, it is included in this paper's sample of involuntary issues. Data is quarterly where available and annual otherwise. Whereas Krishnan et al. use only a single trigger (the total capital ratio), this paper uses three triggers (the Tier I capital ratio, the leverage ratio and the total capital ratio) and also checks for violations in a wider window. These changes accommodate the flexibility that Krishnan et al. argue banks have in determining the necessity and timing of capital infusions and yield a final sample of 75 issues (and 66 announcements[17]) over 1992-2008 as against their sample of 14 issues over 1992-2005[18].

3.2 Estimating Changes in the Value of the Deposit Insurance Guarantee

Following Merton (1977) and Marcus and Shaked (1984) this paper models deposit insurance as a put option.[19] Consider a bank with total assets $\boldsymbol{A}$ and total deposits $\boldsymbol{B}$, appraised annually by the insurer and closed on failure. If the value of the assets follows a diffusion process, then the fair market value of FDIC insurance at time $\boldsymbol{0}$, is given by:

$$\boldsymbol{I} = \boldsymbol{B_T e^{-rT}[1 - N(x_2)] - e^{-\delta T} A_0 [1 - N(x_1)]} \tag{1}$$

[17] Announcement dates were not listed in the SDC database for 9 issues and so these issues were not included in the analysis of announcement returns. They were included in the study of post-issue operating performance, because issue dates were available.

[18] This paper's sample of 75 issues is comprised of 59 issues over the same period and adds 16 issues from the 2005-2008 period.

[19] Whether deposit insurance is fairly priced is not considered. *Changes* in the option value of deposit insurance are used as a control variable. Therefore, any systematic biases in the estimation of the option value due to under- or over-pricing should be immaterial.

where δ = rate of return per dollar of bank assets, r = risk-free rate of interest, σ = the standard deviation of the rate of return on A, **T** = maturity date of the deposit insurance, $N(.)$ is the cumulative normal distribution,

$$x_1 = \frac{\left[log\left(\frac{A_0}{B_T}\right) + \left(r + \frac{\sigma^2}{2} - \delta\right)T\right]}{\sigma T^{\frac{1}{2}}}, \text{ and,}$$

$$x_2 = x_1 - \sigma T^{\frac{1}{2}}$$

Equation (1) is the formula for a put option with exercise price B_T on an asset with a current value A_0 that yields δ.[20] Insurance effectively gives depositors an option to sell their claims on the bank to the FDIC at price B_T. However, as A and σ are not observable, equation (1) cannot be directly estimated. Because the sum of the market values of debt and equity is observable, an implicit solution for I in terms of the observable values of D and E can be obtained[21]:

$$A + I = D + E \tag{2}$$

The implication of this equation is that the firm's value ($D + E$) exceeds its assets A by the value of the FDIC insurance. Following Merton (1974), the variance of the return on the bank's assets, σ, is estimated using the variance of the return on equity prices:

$$\sigma = \sigma_E\left[1 - \frac{B_T e^{-rT} N(x_2)}{e^{-\delta T} A_0 N(x_1)}\right] \tag{3}$$

where σ_E, the standard deviation of the return on the bank's equity, is estimated using daily data over the windows [t – 35, t – 6] and [t + 6, t + 35] respectively. This equation can be used to obtain an implicit solution for σ. Substituting A from (2) into (1) and combining with (3) yields two simultaneous equations in the two unknowns σ and I. As the other parameters can be estimated from observed data, these two unknowns can be found numerically via recursive substitution from equations (1) – (3).[22]

Deposit insurance guarantee values are determined before and after equity issues using the highest available reporting frequency. The resulting values are scaled by total deposits to obtain relative measures. The relative change is calculated as the

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[20] The market yield on U.S. Treasury securities at 1-year constant maturity, quoted on investment basis, obtained from FRED is used here. Option duration is set to one year.

[21] The book value of debt proxies for market value because of the relatively short maturities of most classes of bank debt and the existence of deposit insurance coverage for bulk of the deposit holdings.

[22] The seed value for σ is σ_E **(*E* / (*E* + *D*))**. Multiple starting values equal to 0, 100, and 200 percent, respectively, of equity were used for I as a guard against the existence of multiple solutions. This check proved redundant as all solutions converged within 20 iterations on the same value, irrespective of the seed value of I selected.

change in the scaled guarantee value around the recapitalization date divided by the average of the pre-event and post-event scaled option values. Relative changes are used in the following tests rather than simple percentage changes in guarantee values because the pre-event value (denominator) is essentially zero in some cases.

4. Results

4.1 Descriptive Statistics

Besanko and Kanatas (1996) predict that involuntary issues dilute insiders' holdings. This paper (Panel A, Table 1) confirms this, with a significant average reduction of 2.55% in insider holdings around the announcement date. Unlike Krishnan et al. (2010), no evidence is found of a significant offer price discount (OPD in Panel B, Table 1), implying that market timing is uninfluential in involuntary issues.

Table 1: Descriptive Statistics

Statistic	IOC			UDR	TA	RLSZ	BM	LCR	CDI	OPD
	Relative to Announcement Date									
	Before	After	Chg.	Before						
Min	1.0	1.2	-31.0	0.02	42	0.0	0.05	0.02	0.00	-0.98
Max	81.6	79.4	19.3	0.8	317,824	1.5	5.64	0.8	0.60	2.85
Mean	23.9***	21.3***	-2.6***	0.2***	9,642**	0.06***	0.9***	0.3***	0.05***	-0.01
Median	18.3	16.6	-2.5	0.2	830	0.03	0.60	0.2	0.02	-0.04
N	67	67	67	67	67	67	66	67	75	75

Note: ***IOC*** is the change in insider ownership expressed as a percentage; ***UDR*** is the uninsured/total deposits ratio; ***TA*** is total assets in millions of dollars; ***RLSZ*** is the issue size/total assets ratio; ***BM*** is the book-to-market ratio; ***LCR*** is the loan commitments/total loans ratio; ***CDI*** (average) is an index of capital deficiency; ***OPD*** is the offer price discount. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the mean is zero.

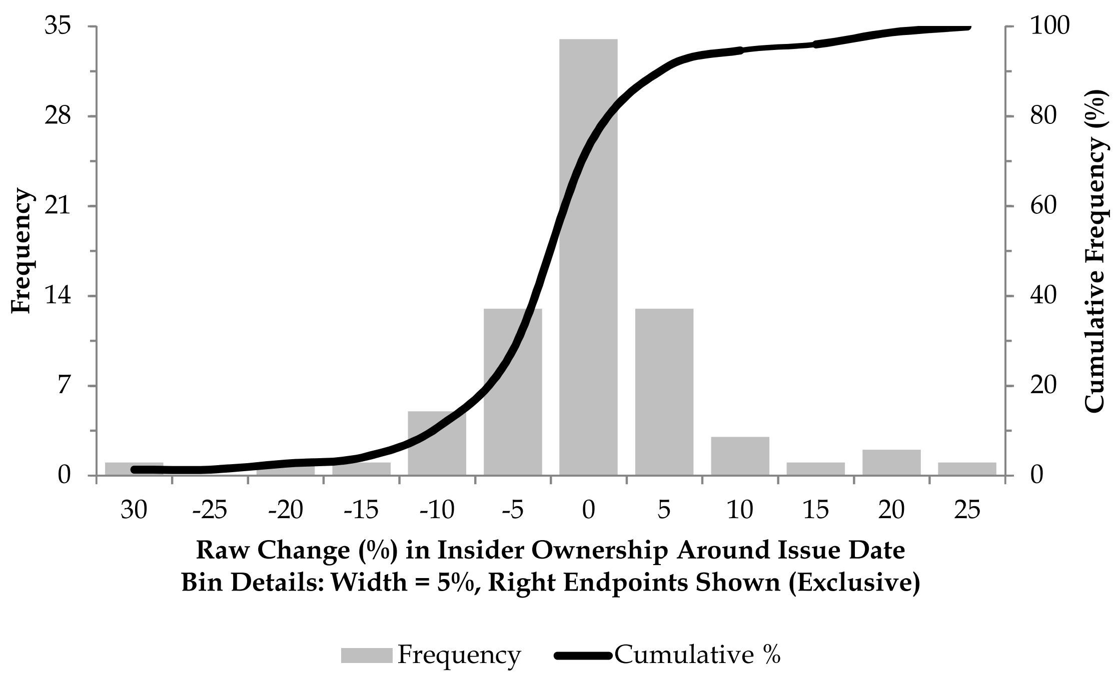
In keeping with regulatory aims, the average raw and scaled deposit insurance option values decline sharply around the announcement date (Table 2). Relative changes in these measures are significantly positive, implying that the riskiest banks see the biggest reductions in risk. The average pre-announcement scaled deposit guarantee value is significantly positive at $17,551 per million dollars of total deposits. The presence of significant deposit insurance guarantees, necessitates their inclusion as controls in the operating performance regressions that follow. These results verify the intuition that involuntary issues dampen the incentives for asset substitution but also reduce insider stakes.

Table 2: Estimates of the Value of Deposit Guarantees/Total Deposits

Statistic	Relative to Announcement Date			
	Before	After	Change	Relative Change
Min	0	0	-493,428	-2.00
Max	675,508	361,290	300,740	2.00
Mean	17,551*	15,372**	-2,180	0.39*
Median	2.35	18.00	0.45	1.18
N	66	66	66	64

Note: The scaled deposit guarantee value (Option Value/Total Deposits) and its change are expressed in dollars per million dollars of deposits. 'Relative Change' is the change in scaled guarantee value relative to the average of its pre- and post-event values, and is preferred to 'Percent Change' to minimize the loss of data due to zero pre-event guarantee value. P values with significance of 10% or better are shown in bold, for the null hypothesis that the mean equals zero. Descriptive statistics for the raw deposit insurance option values are not shown here for lack of space but can be made available on request. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the mean is zero.

Figure 1: Insider Ownership Change around Issue Date



This figure graphs the frequency distribution of the change in insider ownership around the issue date. Insider ownership and its change are both expressed as percentages. The bars denote the number of observations (left y-axis) for various values of insider ownership change (x-axis) and the line traces the cumulative percentage frequency (right y-axis). Observations are placed in bins of 5% width whose upper limits are plotted along the x-axis. For instance, the bin over 0 includes all observations where the insider ownership change (**x**) falls in the interval **-5% ≤ x < 0%**.

4.2 Cumulative Abnormal Returns (CARs) by Degree of Ownership Dilution

The abnormal return for security $\boldsymbol{i}$ on event day $\boldsymbol{t}$ is calculated using the market model as:

$$\boldsymbol{AR_{i,t}} = \boldsymbol{R_{it}} - \left(\boldsymbol{a_i} + \boldsymbol{b_{i1}R_{m,t}} + \boldsymbol{b_{i2}R_{m,t-1}}\right) \tag{4}$$

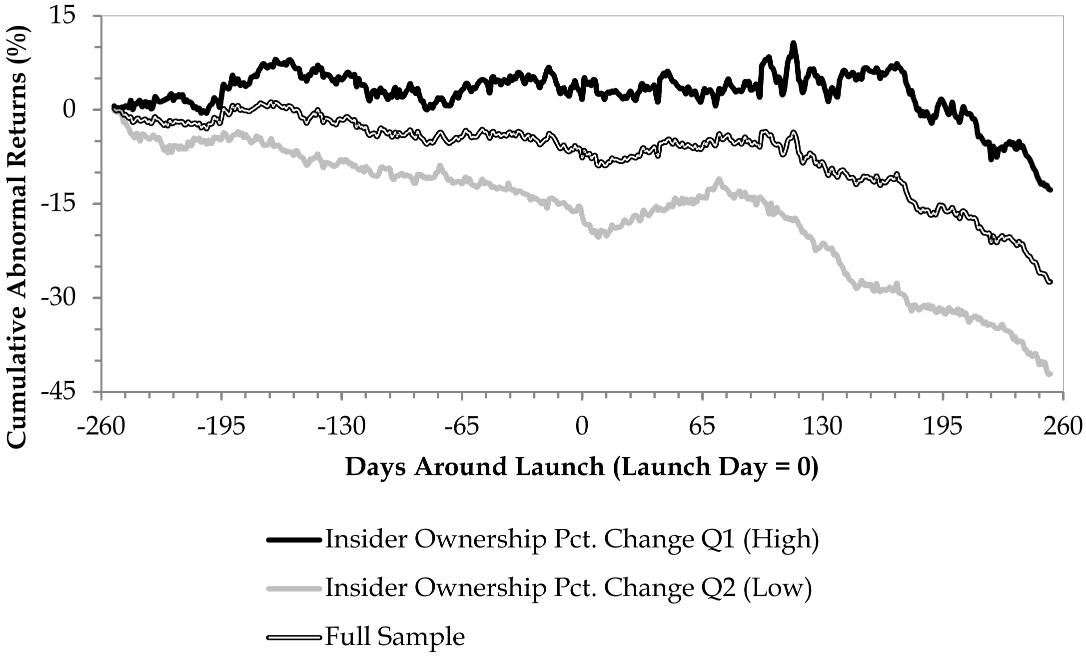
where $\boldsymbol{R_{i,t}}$ and $\boldsymbol{R_{m,t}}$ are the rates of return on security $\boldsymbol{i}$ and the CRSP equally-weighted index on event day $\boldsymbol{t}$, and $\boldsymbol{R_{m,t-1}}$ is its return on day $\boldsymbol{t-1}$ prior to the event. For robustness, returns are also benchmarked against the KBW Bank Index. The coefficients $\boldsymbol{a_i}$, $\boldsymbol{b_{i1}}$ and $\boldsymbol{b_{i2}}$ are OLS estimates of the intercept and slopes of the regression, which includes a lagged market return to allow for asynchronous trading (see Scholes and Williams [1977]). The model parameters are estimated over a symmetric 140-day period (centered on the event), excluding a 40-day window around the event: [[$\boldsymbol{t}$ – 70, $\boldsymbol{t}$ – 21], [$\boldsymbol{t}$ + 21, $\boldsymbol{t}$ + 70]]. Standard event study methodology is employed to compute cumulative abnormal returns and test statistics.

Table 3: Cumulative Abnormal Returns by Insider Ownership

Statistic	Full Sample	Quantiles around Median			Tertiles			
		Q1 (High)	Q2 (Low)	Q1 – Q2	Q1 (High)	Q2 (Mid)	Q3 (Low)	Q1–Q3
Event: Announcement | Window: [-1, 1] | Duration: 3 days								
CAR (%)	-0.38***	1.89	-2.64***	4.53	3.32	-1.27	-2.97***	6.30**
N	66	33	33		21	23	22	
Event: Announcement | Window: [-253,253] | Duration: 507 days								
CAR (%)	-27.43***	-12.77	-42.10***	29.32***	-10.35	-28.17**	-43.40***	33.06***
N	64	32	32		21	22	22	

Note: Cumulative abnormal returns (***CAR***) against the CRSP equally weighted market index for quantiles around the median and tertiles by insider ownership percentage change and the top-bottom inter-quantile spreads are tabulated here. ***CAR***s are shown for both a short 3-day window [-1, 1] and a long 507-day window [-253, 253], around the announcement date. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the CAR is zero. The 'High' changes are the *least* diluted; see Figure 1.

Figure 2: Cumulative Abnormal Returns around Announcement by Insider Ownership



This figure plots the cumulative abnormal returns (***CAR***s) against the CRSP equally weighted market index for the full sample and quantiles above and below the median insider ownership percentage change. Change is calculated as the difference in insider ownership before and after the announcement date. ***CAR***s are shown for a window of [-253, 253] days around the announcement date. The 'High' changes are the *least* diluted; see Figure 1.

Table 3 reports the ***CAR***s around the recapitalization announcement date. ***CAR***s for both short and long horizons, [-1, 1] and [-253, 253] days respectively, are tabulated (Panel A, Table 3). The data are stratified by the change in insider ownership. As in Figure 1, the lower percentage changes represent the more diluted insider ownership positions. Abnormal returns are significantly lower for the banks with the most diluted ownership positions. The results are even stronger for ***CAR*** tertile spreads against the KBW bank index (not shown here for reasons of space but available on request).

Figure 2 shows that ***CAR*** declines consistently and substantially for the full sample over the 253 days before and after the announcement and issue dates. The spread around the median also increases steadily, with the least diluted banks' ***CAR*** being mostly positive while the most diluted banks' ***CAR*** drops sharply over the entire period surrounding the announcement date. These effects are even more striking when the bank index is used as the benchmark (results not shown here but available on request). Table 3 and Figure 2 suggest that the degree of insider dilution significantly affects the market's reaction to the recapitalization, with greater dilutions provoking more negative market reactions.

4.3 Regression Results: Announcement Date CARs

CARs are regressed against percentage changes in insider holding, relative changes in the scaled option value, and other controls as follows:

$$\boldsymbol{CAR_{i,[T_1,T_2]} = a + b_1IOC_{i,[T_1,T_2]} + b_2OVC_{i,[T_1,T_2]} + b_3UDR_{i,T_1} + b_4TA_{i,T_1} + b_5RLSZ_{i,T_1} + b_6BM_{i,T_1} + b_7LCR_{i,T_1} + b_8CDI_{i,T_1} + b_9OPD_{i,T_1} + b_{10}BHC_{i,T_1} + b_{11}POR_{i,T_1} + \varepsilon_i} \quad (5)$$

where $\boldsymbol{CAR_{i,[T_1,T_2]}}$ is the cumulative abnormal return of bank $\boldsymbol{i}$ against the ***CRSP*** market index or the ***KBW*** bank index[23] over the event window **[*T*$_1$, *T*$_2$].** The percentage change in insider ownership, ***IOC***, is obtained from annual proxy filings DEF 14A, which are also usually referenced in the 10-K filings under items 10 and 12.[24] The relative change in the ratio of the value of the deposit insurance guarantee to total deposits, ***OVC***, is calculated using data nearest the event – annual up to 2002 and quarterly thereafter, ***UDR*** is the ratio of uninsured to total deposits[25]; ***TA*** is the total assets of the firm; ***RLSZ*** is the dollar value of the equity raised divided by total assets; ***BM*** is the book-to-market ratio; ***LCR*** is the ratio of unused loan commitments to total loans; ***CDI*** is an index of capital deficiency[26]; ***BHC*** is a dummy that is valued at 1 for a bank holding company and 0 for a bank, with the status being determined at the time of inclusion in the sample; ***POR*** is the payout ratio[27], and ***OPD*** is the final offer price discount to the closing price on the first day of listing of the new shares. ***UDR***, ***TA***, ***RLSZ***, ***BM***, ***LCR***, ***BHC*** and ***POR*** are all as of the last day of the calendar year or quarter prior to the event.

The rationale for the inclusion of these variables is as follows:

UDR – Bhattacharya et al. (1998) argue that incomplete deposit insurance moderates asset substitution and, thus, has a positive relation with the ***CAR***.

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[23] Results against the bank index are not shown here but are available on request.

[24] Depending on when an issue occurs, the pre- and post-event levels of insider holding may be measured at different distances from the event. However, the two measurements span the event date in all cases, with a maximum interval of 1 year. More timely information is used where available from other filings.

[25] Estimated insured deposits include deposit balances less than $100,000 minus benefit-responsive deposits, plus the value of individual deposit accounts of more than $100,000 held in domestic offices. Total deposits are the sum of all deposits including demand deposits, money market deposits, other savings deposits, time deposits and deposits in foreign offices. ***UDR*** is then calculated as the ratio of the difference between total deposits and estimated insured deposits to total deposits.

[26] Using the highest available data frequency, a measure of capital deficiency is constructed for each instance when a bank is not 'well-capitalized.' This measure is the ratio of the percentage shortfall from the 'well-capitalized' norm to the number of days from the event date. This measure signifies greater capital deficiency as the extent of the capital shortfall increases and the distance (in time) from the event decreases. When there are multiple triggers in the initiating horizon **[*t* – *3*, *t* + *1*]**, the average value is used. For robustness, a maximum value of ***CDI*** is also calculated.

[27] The absolute value of the payout ratio is used to treat cases of payout with negative income and from reserves as reflecting high or excessive payout.

RLSZ*, *TA – Asquith and Mullins (1986), Masulis and Korwar (1986) and Mikkelson and Partch (1986) have found that for non-financial firms the relative size of the issue has a negative effect on ***CAR***s. However, Keeley (1989) finds an insignificant negative relation between ***CAR***s and relative issue size. Cornett and Tehranian (1994) also find an insignificant negative difference in ***CAR***s between large and small issues.
BM – Keeley (1990) finds that increases in competition lower charter values, increase asset substitution and reduce capitalization. Bhattacharya et al. (1998) note that high charter values and suitable closure policies are both needed to deter moral hazard. Gonzalez (2005) suggests that factors that reduce charter values, such as stricter regulation and lack of deposit insurance, may increase risk. Thus, high charter values, by limiting risk and raising insiders' surplus, are likely to relate positively with ***CAR***s and post-issue efficiency.
LCR – Boot and Thakor (1991) show that loan commitments lower bank risk.
OPD – Krishnan et al. (2010) find that it is significantly related to bank equity announcement returns.
BHC – An explanation was presented earlier in paragraph 2.1 of this paper. In addition to controlling for this with a dummy variable, this paper runs hypothesis tests on a pure bank sample, after excluding BHCs[28].

Table 4 reports multivariate regression results for equation (5), using the CRSP EW market index as a benchmark. Three return windows ending on the announcement date viz. [-2, 0], [-1, 0] and [0, 0] are examined. As hypothesized, ***IOC*** is positively related to the ***CAR***, after controlling for other factors. This result holds for all windows and is significantly positive in all cases. These multivariate results reinforce the bivariate results for insider dilution and ***CAR*** reported previously. ***OVC*** also shows a significantly positive relation with ***CAR***, implying that wealth transfers from shareholders to the FDIC also contribute to the negative announcement return. The inclusion of ***POR*** improves the significance of the coefficient of ***IOC***. Further ***POR*** is itself significant at horizons of 1 – 2 days before the issue, implying that insiders use dividends to maximize surplus extraction before an anticipated dilution.

4.4 Regression Results: Post-Issue Operating Efficiency with DEA

This paper uses an input minimization, variable returns to scale DEA model based on the Charnes, Cooper and Rhodes (CCR) framework. Unlike parametric models, DEA allows multiple outputs and is suitable for small samples[29]. While DEA assumes measurement without error, this paper uses approximation because the data are based on audited financial statements rather than on subjective allocations.[30]

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[28] Abnormal return regression results on a pure bank sample are available on request.

[29] Rules of thumb for the minimum number of observations are described in Sathye (2001); for example, the sample size must exceed the sum and/or product of inputs and outputs. For the models considered here, the maximum sum/product of inputs and outputs is 10 and sample sizes range from 75 for the shortest horizon (1 year) to 51 for the longest (5 years), providing abundant margin.

[30] Subjective allocations are required for shared items such as office space in branch-level DEA analyses of banks.

Three DEA model specifications are tested as shown in Table 5, where ***IE*** is aggregate interest expenses, ***NIE*** is aggregate non-interest expenses (including capital, labor and other items), ***NCO*** is net charge-offs, ***IL*** is insider loans, ***TD*** is total deposits, ***INV*** is aggregate investments, ***TL*** is total loans, and all inputs and outputs are in dollar amounts.

Efficiency scores are calculated annually for each bank in the post-issue period. The following regression explains changes in these scores with key variables and controls:

$$\boldsymbol{logOPC_{i,[T_2,t]} = a + b_1 IO_{i,T_2} + b_2 OV_{i,T_1} + b_3 UDR_{i,T_1} + b_4 RLSZ_{i,T_1} + b_5 BM_{i,T_1} + b_6 LCR_{i,T_1} + b_7 CDI_i + b_8 OPD_i + b_9 BHC_i + \sigma\varepsilon_i} \qquad (6)$$

where $\boldsymbol{OPC_{i,[T_2,t]}}$ is the $\boldsymbol{i^{th}}$ bank's change in the DEA–efficiency score over the interval[31] [$\boldsymbol{T_2}$, $\boldsymbol{t}$] in the period following the issue; $\boldsymbol{IO_{i,T_2}}$ is its post-issue level of insider ownership; $\boldsymbol{OV_{i,T_1}}$ is its pre-issue scaled deposit insurance put option value; and the other variables have the same definitions as in the previous section but are measured before the issue date. The coefficient $\boldsymbol{b_1}$ is expected to be positive based on the hypothesized insider agency effect.

Table 6 reports multivariate regression results from equation (6) with three DEA specifications, from 1 to 5 years. The coefficient $\boldsymbol{b_1}$ is uniformly positive, implying that banks with the lowest post-issue insider stakes experience the greatest

[31] $\boldsymbol{T_1}$ is the latest date for which data is available prior to the issue date, $\boldsymbol{T_2}$ is the earliest date for which data is available after the issue date and $\boldsymbol{t}$ is the number of years incremented from $\boldsymbol{T_2}$ in the post-issue period.

Table 4: A Model of Cumulative Abnormal Returns

IOC	OVC	UDR	TA	RLSZ	BM	LCR	CDI	OPD	BHC	POR	EDF	Adj. R^2(%)
Dependent Variable: CAR in the Window [2,0] before the Announcement Date												
2.96***	76.76**	314	-0.005*	-114.90	-387.14***	-1156.57**	469.29	655.69***	420.45**	1.81***	52	20.07
Dependent Variable: CAR in the Window [1,0] before the Announcement Date												
2.52**	87.02**	719*	-0.002	-514.03*	-267.30**	-1363.99***	1447.36*	420.41*	242.34	1.06*	52	20.02
Dependent Variable: CAR on [0,0] the Announcement Date												
1.93*	93.99**	979**	0.003	-211.93	-87.03	-1242.06***	1115.89	-46.26	285.84	-0.07	51	9.82

Note: Model: $\boldsymbol{CAR_{i,[T_1,T_2]} = a + b_1 IOC_{i,[T_1,T_2]} + b_2 OVC_{i,[T_1,T_2]} + b_3 UDR_{i,T_1} + b_4 TA_{i,T_1} + b_5 RLSZ_{i,T_1} + b_6 BM_{i,T_1} + b_7 LCR_{i,T_1} + b_8 CDI_{i,T_1} + b_9 OPD_{i,T_1} + b_{10} BHC_{i,T_1} + b_{11} POR_{i,T_1} + \varepsilon_i}$ where $\boldsymbol{CAR_{i,[T_1,T_2]}}$ is the $\boldsymbol{i}^{th}$ bank's cumulative abnormal return against the CRSP EW market index over the event window **[*T*1, *T*2]**; ***IOC*** is the announcement date percentage change in insider ownership; ***OVC*** is the announcement date relative change in the deposit insurance guarantee value; ***UDR*** is the uninsured/total deposits ratio; ***TA*** is total assets; ***RLSZ*** is the issue size/total assets ratio; ***BM*** is the book-to-market ratio; ***LCR*** is the loan commitments/total loans ratio; ***CDI*** (average) is an index of capital deficiency; ***OPD*** is the offer price discount; ***BHC*** is a dummy that is valued at 1 for a bank holding company and 0 for a bank; ***POR*** is the payout ratio, and ***UDR*, *TA*, *RLSZ*, *BM*, *LCR*, *BHC*** and ***POR*** are pre-announcement values. The last two columns show the error degrees of freedom and the adjusted R^2 (%), respectively, and the regression coefficients reported in the rows are multiplied by 10,000 for readability. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the coefficient is zero in each case. Intercepts are not shown. Similar results against the KBW bank index are available on request.

Table 5: Models of Post-Issue Changes in Operating Performance – Data Envelopment Analysis (DEA)

Model	I/O	Inputs (I) / Outputs (O)						
		IE	**NIE**	**NCO**	**IL**	**TD**	**INV**	**TL**
1	I	X	X			X		
	O						X	X
2	I	X	X	X		X		
	O						X	X
3	I	X	X	X	X	X		
	O						X	X

Note: Table 5 shows three DEA model specifications which are tested in Table 6, where ***IE*** is aggregate interest expenses, ***NIE*** is aggregate non-interest expenses (including capital, labor and other items), ***NCO*** is net charge-offs, ***IL*** is insider loans, ***TD*** is total deposits, ***INV*** is aggregate investments, ***TL*** is total loans, and all inputs and outputs are in dollar amounts. Results are shown separately for ***DEA*** efficiencies (and changes therein) calculated using three different input-output models. These models have common outputs – ***loans*** and ***investments***, but the inputs to these models are varied as shown below:
Model 1: ***Deposits, Interest expense, Non-interest expense***
Model 2: ***Deposits, Interest expense, Non-interest expense, Net charge-offs***
Model 3: ***Deposits, Interest expense, Non-interest expense, Net charge-offs, Insider loans***

Table 6: Post-Issue Changes in Operating Performance – Data Envelopment Analysis (DEA)

IO	OV	UDR	RLSZ	BM	LCR	CDI	OPD	BHC	EDF	Adj. R^2
Dependent Variable: 1-Year Post-Issue Change in Overall Efficiency										
0.12	-3.40***	-57.29**	226.58**	-13.06	-12.47	152.49***	17.77**	3.52	63	17.83
0.42*	-0.43	-10.32	23.02	-15.59*	-30.47	70.36	12.67	-0.20	63	2.06
0.38*	-1.45	-54.66**	120.91	-5.89	5.27	-6.93	5.57	6.02	63	0.33
Dependent Variable: 2-Year Post-Issue Change in Overall Efficiency										
0.32	0.45	-50.59**	-20.64	-7.27	9.53	102.73*	35.18***	8.46	59	22.20
0.72**	-0.81	-27.06	67.14	-22.66**	-7.86	9.36	3.54	10.41	59	4.43
0.51*	-0.89	-40.16	92.18	5.03	-2.44	98.87	10.86	4.65	59	0.56
Dependent Variable: 3-Year Post-Issue Change in Overall Efficiency										
0.68**	2.97*	20.64	-60.71	20.68	6.92	17.45	18.32	15.11	54	7.63
0.67**	-1.00	19.86	190.35	1.21	-12.38	56.81	3.51	9.89	54	-2.86
0.57*	-1.51	3.71	135.08	9.12	-16.25	270.57***	18.24	7.57	53	11.32
Dependent Variable: 4-Year Post-Issue Change in Overall Efficiency										
0.16	-0.58	-75.98**	19.69	-6.56	65.47*	124.24	17.58	-2.62	48	1.28
0.89***	-1.19	-51.49	125.93	-37.06**	48.87	9.15	33.85***	-2.12	48	21.83
0.90***	-1.55	-5.59	220.12*	19.65	25.09	124.54*	26.78***	7.85	48	13.54
Dependent Variable: 5-Year Post-Issue Change in Overall Efficiency										
0.46	-2.88*	-80.68**	99.88	2.27	1.22	78.55	-35.15	-10.60	40	19.53
0.70**	-1.68	-25.80	81.90	-29.84*	-28.76	163.09	5.04	-5.44	40	12.41
0.70*	-2.59	-61.54	172.60	1.84	3.43	142.70	-11.87	-4.09	40	5.39

Model: $logOPC_{i,[T_2,t]} = a + b_1IO_{i,T_2} + b_2OV_{i,T_1} + b_3UDR_{i,T_1} + b_4RLSZ_{i,T_1} + b_5BM_{i,T_1} + b_6LCR_{i,T_1} + b_7CDI_i + b_8OPD_i + b_9BHC_i + \varepsilon_i$ with a multiple linear regression, where T_1 and T_2 are the latest pre-issue and the earliest post-issue dates, respectively, for which data is available; t is the number of years incremented from T_2 in the post-issue period; $OPC_{i,[T_2,t]}$ is the i^{th} bank's change in the overall efficiency measured using ***DEA*** over the interval $[T_2, t]$ in the period following the issue; ***IO*** is the post-issue insider ownership level; ***OV*** is the deposit guarantee value/deposits ratio; ***UDR*** is the uninsured/total deposits ratio; ***RLSZ*** is the issue size/total assets ratio;; ***BM*** is the book/market ratio; ***LCR*** is the loan commitments/total loans ratio; ***CDI*** (average) is an index of capital deficiency; ***OPD*** is the offer price discount; ***BHC*** is a dummy valued at 1 for bank holding companies and 0 for banks at any time before or after the issue, and ***OV***, ***UDR***, ***RLSZ***, ***BM*** and ***LCR*** are pre-issue values. The inclusion of total assets (***TA***) as a proxy for size does not materially change the conclusions presented here; separate results including ***TA*** are available on request. Results are shown separately for ***DEA*** efficiencies (and changes therein) calculated using three different input-output models. These models have common outputs – ***loans*** and ***investments***, but the inputs to these models are varied as described in Table 5.

Error degrees of freedom and the adj. R^2 (%) are shown in the last two columns. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the coefficient is zero in each case. Intercepts are not shown, the OV coefficient is multiplied by 1 million and all other coefficients are multiplied by 100 for readability.

efficiency losses. This relation is significant over 3 to 5 years for the first specification without the direct proxies for insider agency problems – net charge-offs and insider loans. When these proxies are input into the remaining specifications, significance improves markedly and holds for all horizons. These results suggest that the negative announcement reaction to insider dilution documented earlier is justified ex post by a significant deterioration in aggregate efficiency.

4.5 Regression Results: Post-Issue Operating Efficiency with Accounting Measures

Several traditional univariate proxies for operating performance are also evaluated: (i) The ***efficiency ratio*** is non-interest expense, less the amortization expense of intangible assets, as a percent of the sum of net interest income and non-interest income. (ii) The ***net charge-offs/loans ratio*** is the gross loan and lease financing receivable charge-offs, less gross recoveries, (annualized) as a percent of average total loans and lease financing receivables. This measure reflects the quality of management's historical asset choices and monitoring efforts. (iii) The ***loss allowance/loans ratio*** is calculated as the allowance for loan and lease losses as a percentage of total loan and lease financing receivables (excluding unearned income). This measure provides a forward-looking, albeit subjective, view of management's asset quality decisions. (iv) The ***assets/employee ratio*** is the total assets in millions of dollars divided by the number of full-time equivalent employees. This measure captures employee productivity. The first three ratios listed here are all inverse measures of efficiency, with higher values implying greater inefficiency. The fourth ratio is a direct measure of efficiency, with higher values implying greater efficiency.

Table 7 presents summary statistics for the accounting measures of operating performance. The average operating performance of the full sample worsens non-monotonically over all horizons for the first 3 measures. The following regression explains changes in these measures with key variables and controls:

$$\boldsymbol{OPC_{i,[T_2,t]} = a + b_1 D_1 IO_{i,T_2} + b_2 D_2 IOC_{i,[T_1,T_2]} + b_3 OV_{i,T_1} + b_4 UDR_{i,T_1} + b_5 RLSZ_{i,T_1} + b_6 BM_{Ti,_1} + b_7 LCR_{i,T_1} + b_8 CDI_i + b_9 OPD_i + b_{10} BHC_i + \varepsilon_i} \qquad (7)$$

where $\boldsymbol{OPC_{i,[T_2,t]}}$ is the $\boldsymbol{i}^{th}$ bank's change in the proxy for operating performance or failure over the interval $[T_2, t]$ in the period following the issue; $\boldsymbol{D_1}$ and $\boldsymbol{D_2}$ are dummy variables that equal 1 or 0 and are used to generate specifications with various combinations of the post-issue level and change of insider ownership; and all other variables have the same meanings as in the previous section.

Regression results from equation (7) are reported in Table 8. The coefficient on the post-issue insider holding is almost uniformly negative, implying that lower post-issue insider holdings worsen efficiency by the first three measures considered here (Panels A – C). This relationship is significant 3 – 5 years later for the asset quality measures (the net charge-offs/loans and loan allowance/loans ratios) and 1 year later for the efficiency ratio. A 10% drop in insider shareholding post-issue produces a 0.23% increase in the net charge-off/loans ratio over 4 years (Panel B). Given an average pre-issue ratio of 0.48%, this implies relative deterioration of 48% in asset quality. The impact on the loan allowance/loans ratio is almost identical but the average pre-issue ratio is 1.3%, implying relative deterioration of 17% (Panel C). The same stimulus also produces a 3.94% increase (worsening) in the efficiency ratio within 1 year or relative deterioration of 5.42%, given the average pre-issue ratio of 72.78% (Panel A). Finally, changes in the assets/employee ratio have a significant positive relation with the post-issue level of insider holding over 2 – 4 years, implying that banks with weakened insider positions deploy their workforces less efficiently (Panel D). A 10% drop in insider shareholding post-issue produces a 0.24 unit increase in the assets/employee ratio over 4 years implying a relative increase in headcount of 5.23%, given the average pre-issue ratio of 4.68. These univariate results are consistent with the multivariate DEA results from the previous section[32]. Thus, the finding that weakened insider holdings worsen efficiency is robust to various specifications.

Table 7: Post-Issue Changes in Operating Performance: Accounting Measures

	Change over Period					
	Around	After				
Statistic	**Issue**	**1 year**	**2 years**	**3 years**	**4 years**	**5 years**
			Efficiency Ratio (Non-Interest Expense/Total Income)			
Min	-62.22	-65.75	-75.67	-1561.69	-98.08	-86.43
Max	59.76	175.90	705.50	1882.82	151.14	112.35
Mean	-0.16	3.29	12.46	8.03	9.74*	1.96
Median	-0.15	0.03	0.12	1.35	1.69	-0.76
N	75	74	69	64	59	50
			Net Charge-Offs/Loans			
Min	-4.62	-1.18	-2.16	-2.97	-3.27	-3.34
Max	3.32	3.13	3.24	6.09	7.30	4.40
Mean	-0.06	0.02	0.12	0.35**	0.27	0.38*
Median	-0.01	0.01	0.01	0.04	0.01	0.07
N	75	74	69	64	59	50
			Loan Allowance/Loans			
Min	-2.44	-1.48	-1.85	-2.13	-2.35	-2.05
Max	1.59	3.57	5.36	5.26	6.20	3.62
Mean	-0.03	0.06	0.19	0.23*	0.31*	0.13
Median	-0.01	0.01	0.01	0.08	0.08	0.05
N	75	74	69	64	59	50
			Total Assets/Employee			
Min	-4.23	-4.39	-10.52	-13.78	-13.37	-13.78
Max	2.55	5.50	3.74	4.11	3.18	5.46
Mean	0.19**	0.37***	0.07	0.12	0.29	0.65
Median	0.19	0.22	0.44	0.71	0.85	1.48
N	75	74	69	64	59	50

Note: The table presents summary statistics for changes in different proxies of operating performance, over various post-issue horizons. Increases in the first three proxies denote deteriorating operating performance, as do decreases in the fourth proxy. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the mean equals zero.

[32] Univariate and multivariate here are used to denote the dependent variable and not the regression relationship which is multivariate in both cases.

Table 8: Post-Issue Changes in Operating Performance – Univariate Accounting Measures

Panel A				Panel B				Panel C				Panel D			
Non-Interest Expense/Total Income				Net-Charge Offs/Loans				Loan Allowance/Loans				Total Assets/Employee			
IO	**IOC**	**EDF**	**Adj. R^2**	**IO**	**IOC**	**EDF**	**Adj. R^2**	**IO**	**IOC**	**EDF**	**Adj. R^2**	**IO**	**IOC**	**EDF**	**Adj. R^2**
Dependent Variable: 1-Yr Post-Issue Change															
-394.19**		64	7.29	-5.75		64	11.76	-4.36		64	-2.20	-1.03		64	8.77
	9.19	64	1.69		0.40	64	9.21		-0.15	64	-3.77		0.61	64	9.04
-392.59**	6.59	63	5.87	-5.66	0.36	63	10.83	-4.40	-0.18	63	-3.72	-0.88	0.61	63	7.61
Dependent Variable: 2-Yr Post-Issue Change															
117.31		59	-0.16	-6.89		59	3.29	-8.32		59	-6.93	21.72*		59	61.04
	87.47	59	-0.07		1.25	59	1.37		-4.22	59	-6.30		4.26	59	59.42
92.26	82.02	58	-1.77	-7.40	1.68	58	2.34	-7.16	-3.80	58	-6.74	20.79*	3.03	58	60.57

Note: Model: $\boldsymbol{OPC_{i,[T_2,t]} = a + b_1 D_1 IO_{i,T_2} + b_2 D_2 IOC_{i,[T_1,T_2]} + b_3 OV_{i,T_1} + b_4 UDR_{i,T_1} + b_5 RLSZ_{i,T_1} + b_6 BM_{Ti,1} + b_7 LCR_{i,T_1} + b_8 CDI_i + b_9 OPD_i + b_{10} BHC_i + \varepsilon_i}$ with a multiple linear regression, where T_1 and T_2 are the latest pre-issue and the earliest post-issue dates, respectively, for which data is available; $\boldsymbol{t}$ is the number of years after T_2 in the post-issue period; $\boldsymbol{OPC_{i,[T_2,t]}}$ is the change in the proxy for operating performance for the $\boldsymbol{i}^{th}$ bank over the interval [T_2, $\boldsymbol{t}$] in the period following the issue; ***IO*** is the post-issue insider ownership level; ***IOC*** is the issue date percentage change in insider ownership; D_1 and D_2 are dummies that take the values 0 and 1 to generate specifications that include the variables ***IO*** and ***IOC*** separately and together; ***OV*** is the deposit guarantee value/deposits ratio; ***UDR*** is the uninsured/total deposits ratio; ***RLSZ*** is the issue size/total assets ratio;; ***BM*** is the book/market ratio; ***LCR*** is the loan commitments/total loans ratio; ***CDI*** (average) is an index of capital deficiency; ***OPD*** is the offer price discount; BHC is a dummy valued at 1 for bank holding companies and 0 for banks at any time before or after the issue; and ***OV***, ***UDR***, ***RLSZ***, ***BM*** and ***LCR*** are pre-issue values. The inclusion of total assets (***TA***) as a proxy for size does not materially change the conclusions presented here; separate results including ***TA*** are available on request. Each panel has a different operating performance proxy as the dependent variable, with the error degrees of freedom and the adj. R^2 (%), in the last two columns. The regression coefficients are multiplied by 1,000 for readability and the symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively for the null hypothesis that the coefficient equals zero. Display is restricted to the main variables of interest due to space constraints.

Continued: Table 8: Post-Issue Changes in Operating Performance – Univariate Accounting Measures

Dependent Variable: 3-Yr Post-Issue Change															
-1461.07		54	-12.59	-22.72**		54	0.04	-18.17*		54	0.66	23.71		54	71.59
	-147.89	54	-13.15		-2.84	54	-6.94		-8.45**	54	1.99		6.07	54	70.71
-1440.14	-71.31	53	-14.71	-22.24*	-1.65	53	-1.63	-15.94*	-7.60*	53	5.42	22.27	4.88	53	71.38
Dependent Variable: 4-Yr Post-Issue Change															
-393.69		49	42.86	-23.01**		49	4.04	-22.53**		49	5.28	24.49*		49	70.87
	-282.10***	49	47.41		-6.31	49	-0.74		-11.37**	49	7.86		4.10	49	69.39
-290.55	-259.61**	48	47.82	-21.16*	-4.67	48	3.68	-18.58*	-9.94**	48	11.56	23.59	2.27	48	70.34
Dependent Variable: 5-Yr Post-Issue Change															
-350.51		40	-7.99	-15.85		40	-5.06	-11.18		40	0.84	23.88		40	51.72
	-304.26***	40	7.23		-6.25	40	-4.73		-8.56**	40	9.79		0.73	40	50.65
-193.35	-289.50***	39	5.89	-13.00	-5.26	39	-5.35	-6.81	-8.04**	39	8.50	24.50	-1.14	39	50.50

4.6 Post-Issue Survival Analysis

With the idea that failure represents extreme inefficiency, this paper uses an accelerated failure time model (AFTM) to study banks' survival rates after forced recapitalizations. If $S_i(t)$ is the survivor function for bank i, then for any other bank j: $S_j(t) = S_i(\Phi_{ij}\ t)$ for all t, where Φ_{ij} is a constant that is specific to the pair (i, j). An AFTM similar to an ordinary linear regression model is estimated as follows:

$$[(\log S_{i,t}) \times D] = a + b_1 IO_{i,T_2} + b_2 OV_{i,T_1} + b_3 UDR_{i,T_1} + b_4 RLSZ_{i,T_1} + b_5 BM_{i,T_1} + b_6 LCR_{i,T_1} + b_7 CDI_i + b_8 OPD_i + b_9 BHC_i + \sigma\varepsilon_i \quad (8)$$

where $S_{i,t}$ is the survival time in years (t) of the i^{th} bank after forced recapitalization and D is a dummy variable that equals 1 if failure occurs during observation and 0 otherwise (right-censoring). For right-censored observations, the survival time equals the observation period and survivors with a history less than the observation period are excluded. The model is estimated for post-issue horizons from 1 to 10 years. Unit variance is assumed for the error term ε_i and the scale parameter σ is used to accommodate changes in the disturbance variance. Error variance is assumed to be log-normally distributed after testing several distributions for fit. A non-parametric Cox proportional hazards model using partial likelihood estimation was also tested. Although the results parallel the parametric model results presented here, they are less significant, as the maximum likelihood estimation used in the AFTM preserves more significance especially for the small sample of this paper.

Figure 3 shows cumulative probability plots for the log-normal distribution for 10 years post-issue. Panel A shows failure defined as closure or merger with assistance and Panel B shows failure defined as closure or mergers with or without assistance. The points represent failures and must lie on a straight line within the 95% confidence intervals. This is approximately true for both panels, suggesting that the log-normal distribution provides a reasonable fit.

Table 9 shows the results from the AFTM estimation. Panel A features a frequency table of failure incidence, over expanding post-issue periods from 1 to 10 years. The failure rate steadily increases from 1.33% within 1 year to 74.47% within 10 years. Almost half the uncensored sample also fails over the available history. Even by the narrower definition, more than a third of the banks fail within 10 years.

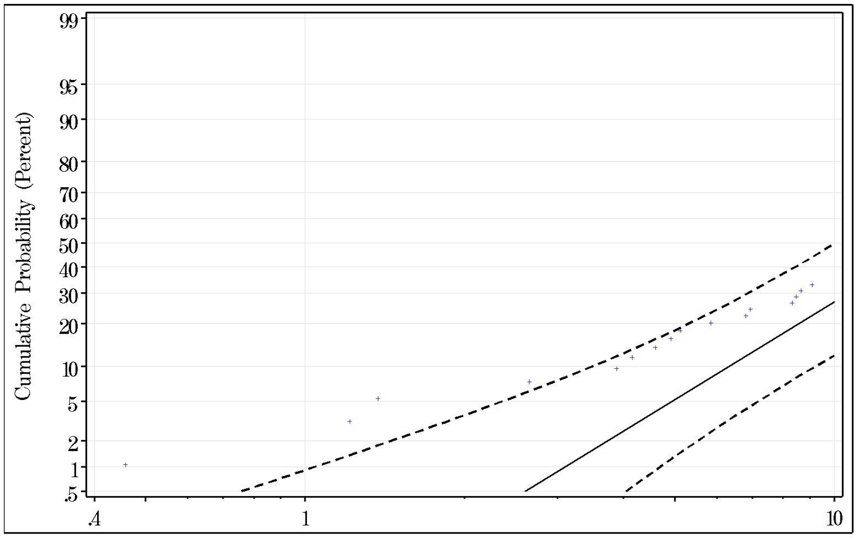
Panel B reports the AFTM parameter estimates, for failure defined narrowly. The coefficient of post-issue insider ownership is positive from 3 to 10 years[33], with significance at the 5% level or higher from years 5 to 10. This implies that banks with higher post-issue insider ownership survive longer. For instance, over 5 years, a 1% drop in insider ownership reduces life expectancy by a substantial and significant 3.06%[34]. This is especially revealing given the rigorous controls for several

[33] Parameters for 1 & 2 years are unreliable due to insufficient failures and are excluded.

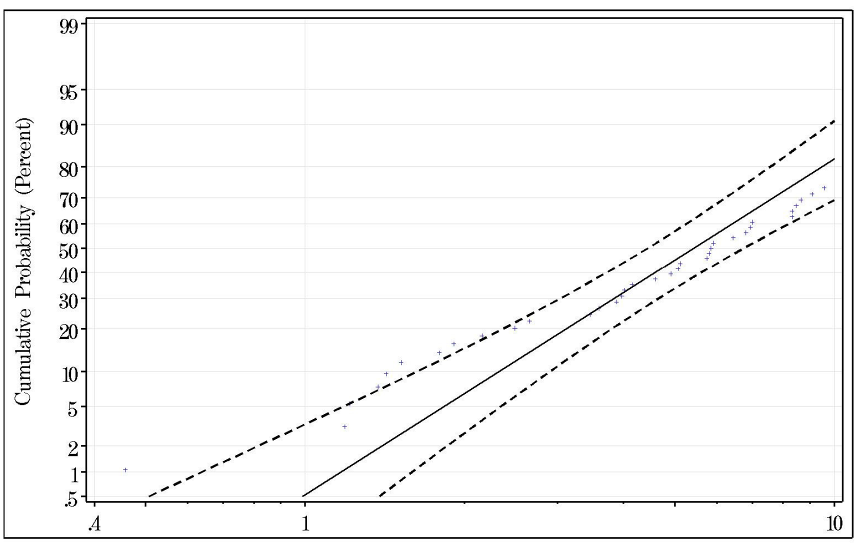
[34] A unit change in the stimulus IO (post-issue insider ownership) produces an effect of $100 \times (e^{b_1} - 1)$ on the response S_i (survival time), where b_1 is the coefficient of IO.

covariates[35], of which, higher (scaled) deposit insurance option values, book-to-market ratios and uninsured-to-total deposits, all tend to significantly reduce the bank's survival time, in line with intuition.

Figure 3: Cumulative Probability (Y-axis) Plot[36] of Bank Lifespan (X-axis) in Years
Panel A: Failure Defined as Closure or Merger (with Assistance)



Panel B: Failure Defined as Closure or Merger (with or without Assistance)



[35] There is also no reason to suspect pre-issue distress or selection bias. The median B/M ratio is a healthy 0.66 and B/M < 1 for 75% of the sample. Further, the median net charge-offs/loans and loan loss provisions/loans ratios are just 0.11% and 1.13%, respectively.
[36] The error variance is assumed to follow the normal distribution and the response variable (survival time) therefore follows the lognormal distribution.

Table 9: Survival Analysis

Panel A: Distribution of Failure by Severity

		Frequency Table for Post-Issue Failure/Survival over Various Periods of Observation (Years)										Lifetime
No.	**Categories of Failure/Survival**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(Uncensored)**
1	Closure or Merger with Assistance (MWA)	1	3	4	5	8	10	12	12	15	16	16
2	Merger without Assistance (MWOA)	0	5	7	10	11	15	16	17	18	19	21
3	Total Failure & Merger: (1) + (2)	1	8	11	15	19	25	28	29	33	35	37
4	Survival (S)	74	67	62	55	49	41	34	27	22	12	38
5	Aggregate Sample	75	75	73	70	68	66	62	56	55	47	75
6	Total Failure / Aggregate Sample: [(3) / (5) %]	1.33	10.67	15.07	21.43	27.94	37.88	45.16	51.79	60.00	74.47	49.33

Note: Failure is categorized into two categories – closure/assisted merger (***MWA***) and unassisted merger (***MWOA***). Banks which are not observed to fail or merge during a specified observation period are treated as survivors (S) for that horizon. We survey the incidence of failure over expanding post-issue windows ranging from 1 to 10 years. Observations are right-censored within each window and survivors with a history less than the period of observation are excluded. The last column shows the uncensored distribution of failure/survival over the available life history of the entire sample.

Panel B: Failure Defined as Closure or Merger (with Assistance)

Years	IO	OV	UDR	RLSZ	BM	LCR	CDI	OPD	BHC	Scale (σ)
3	1.31	-14.32***	-152.12	1558.85	-38.65	76.64	-56.51	21.21	-20.48	0.50
4	2.20	-11.81	-212.51	1782.36	-61.73	57.64	-51.27	51.12	11.10	0.63
5	3.23**	-7.03	-196.78*	995.53	-71.94**	26.63	-65.41	100.67	48.13	0.64
6	2.60**	-10.44*	-226.52**	1205.54*	-63.41**	56.51	-47.79	85.88	60.51	0.69
7	2.59***	-9.21	-242.29**	1336.05*	-64.02**	62.60	-16.90	227.45*	65.67	0.68
8	3.08***	-8.54	-365.74***	1083.65	-78.00**	104.74	-42.62	253.42	83.23	0.77
9	2.65***	-10.41***	-356.34***	505.69	-70.19***	-28.12	31.80	222.34*	59.61	0.65
10	2.59***	-10.95**	-355.97***	586.96	-67.81***	-9.93	35.58	200.71	57.79	0.67

Table 9: Survival Analysis (continued):

Panel C: Failure Defined as Closure or Merger (with or without Assistance)

Years	IO	OV	UDR	RLSZ	BM	LCR	CDI	OPD	BHC	Scale (σ)
2	0.93*	-8.79***	2.69	2599.98**	-43.78***	140.93	-13.58	-47.48**	-9.87	0.22
3	1.18	-1.33	176.33	55.70	-73.73***	-128.72	-9.50	-39.81	-7.56	0.65
4	2.11**	0.21	53.10	76.00	-89.58***	-93.85	-32.87	-37.69*	13.90	0.66
5	1.49**	-1.28	24.23	278.22	-79.67***	-69.43	-61.40	-38.82*	27.00	0.73
6	1.48**	-0.85	54.83	374.21	-77.06***	-74.36	-24.54	-37.24*	44.84	0.70
7	1.56**	-0.39	48.91	452.23	-77.12***	-62.70	-15.23	-34.36	56.31**	0.72
8	1.87***	2.01	44.98	201.67	-87.49***	-41.34	-43.35	-29.24	65.22**	0.72
9	1.55***	-1.47	-0.77	131.00	-74.85***	-26.65	-76.34	-21.51	65.94**	0.71
10	1.38**	-0.05	17.35	33.26	-76.45***	-17.45	-49.32	-19.32	60.63**	0.63

Note: **Panels B and C** model: $[(logS_{i,t}) \times D] = a + b_1 IO_{i,T_2} + b_2 OV_{i,T_1} + b_3 UDR_{i,T_1} + b_4 RLSZ_{i,T_1} + b_5 BM_{i,T_1} + b_6 LCR_{i,T_1} + b_7 CDI_i + b_8 OPD_i + b_9 BHC_i + \sigma\varepsilon_i$ with an accelerated failure time model, where T_1 and T_2 are the latest pre-issue and the earliest post-issue dates, respectively, for which data is available; where $S_{i,t}$ is the survival time in years (t) of the i^{th} bank after forced recapitalization and D is a dummy variable that takes the value 1 if failure occurs during the period of observation and 0 otherwise (right-censoring). For right-censored observations, the survival time is set to equal the observation period and survivors with a history less than the period of observation are excluded from that window. The model is estimated for various event horizons ranging from 1 to 10 years after a forced recapitalization. The error term ε_i is taken to have unit variance and the scale parameter σ is used to accommodate changes in the disturbance variance. The error term ε_i is assumed to follow the normal distribution and the response variable $S_{i,t}$ therefore follows the lognormal distribution. As before, ***IO*** is the post-issue insider ownership level; ***OV*** is the deposit guarantee value/deposits ratio; ***UDR*** is the uninsured/total deposits ratio; ***RLSZ*** is the issue size/total assets ratio; ***BM*** is the book/market ratio; ***LCR*** is the loan commitments/total loans ratio; ***CDI*** (average) is an index of capital deficiency; ***OPD*** is the offer price discount; ***BHC*** is a dummy valued at 1 for bank holding companies and 0 for banks at any time before or after the issue, and ***OV***, ***UDR***, ***RLSZ***, ***BM*** and ***LCR*** are pre-issue values. The first column shows the period of observation and the last column shows the scale factor σ. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, from the Chi squared distribution for the null hypothesis that the coefficient equals zero in each case. Intercepts are not shown, the OV coefficient is multiplied by 1 million and all other coefficients except the scale parameter are multiplied by 100 for readability.

Panel C shows the AFTM parameter estimates, for failure defined broadly and realistically. Expectedly, the previous results are strengthened with a positive post-issue insider ownership coefficient from 2 to 10 years[37], and significance at 5% or higher in most periods. Over 5 years, a 1% drop in insider ownership reduces life by 1.45%. As in Panel B, higher B/M ratios lower survival time but the relationship of other covariates is not significant.

The final columns in Panels B & C show a scale parameter ($\boldsymbol{\sigma}$) that compresses or stretches the hazard function, which has an inverted U-shape for the log-normal distribution fitted here. The hazard peaks rapidly or slowly when $\boldsymbol{\sigma}$ is large or small, respectively. In this sample, $\boldsymbol{\sigma}$ lies between 0.50 and 1.00.

5. Conclusion

Regulators demand that weakly capitalized banks raise additional capital with the goal of reducing the public's exposure to bank risk-taking. Banks frequently raise capital by issuing equity. This paper examines a sample of these involuntary equity issues made during 1995-2010 and finds that they are associated with significantly negative announcement period returns.

There are a couple of arguments that could be made against the supposed involuntary nature of the issues in the sample of this paper. The first argument is that the triggers to determine involuntary issues are based on the PCA rules for banks and may not apply to BHCs which are regulated in laxer fashion than banks. However, banks account for 87% of the sample and the results in this paper stand even when this factor is controlled for with a dummy variable or with the use of a pure sample that excludes BHCs. The second argument is that the regulator is likely to use other methods such as dividend reinvestment to shore up capital before forcing the bank to issue new equity. However, an investigation of the sample in this paper reveals the opposite to be true i.e. banks experience a surge in payout in the year prior to their SEOs. This payout history not only fails to overturn the hypothesis of this paper on the involuntary nature of these issues but actually ends up supporting the insider agency story laid out here, as explained in the results section of this paper.

Negative announcement returns for bank capital issues have been linked to three potential explanations. First, they may be due to market timing. The bank may simply be issuing overvalued equity. The very act of issuing equity reveals that information to the market which reacts by reducing the bank's stock price. This is unlikely in the sample of this paper because the issuers are known to have weak capital positions. In fact, this paper does not find any evidence that the issues follow stock price run-ups. It follows, therefore, that the negative returns are not a reflection of managerial opportunism (or market timing).

Second, the increased capital cushion provided by the new equity reduces the put option value of the FDIC's deposit insurance. This reduction in value is a straightforward wealth transfer from the bank's equity holders to the deposit insurer.

[37] The parameter estimates for the 1-year horizon are unreliable due to an insufficient number of failures and are therefore excluded from the display.

This paper finds evidence that this mechanism explains at least part of the negative stock price reaction to involuntary bank equity issues. The magnitude of the reaction is positively related to the magnitude of the reduction in this paper's estimate of the value of the deposit insurance. This explanation suggests that because the incentives for risk-shifting forms of asset substitution would be reduced, the bank will be less likely to fail in future periods. In other words, this effect, although adverse for shareholders in the near term, augurs well for the future health of the bank.

Third, as Besanko and Kanatas (1996) argue, equity issues may dilute the ownership position of the current manager-owners and thereby increase agency costs within the bank. If this is the case, it would be reasonable to expect a deterioration in future operating performance as the insiders' incentives to maximize shareholder wealth decline. Under this interpretation, some degree of the negative announcement returns reflects the present value of increased agency costs. Consistent with this notion, this paper finds that the negative announcement returns are strongly related to the dilution of the insider owners' equity stake. Moreover, this paper estimates a multidimensional measure of operating efficiency (using data envelope analysis) and finds that subsequent declines in operating performance are strongly related to dilution of the insider's ownership position. Finally, this paper also finds robust evidence that the probability of the bank surviving as an independent firm is negatively related to the degree of ownership dilution.

Some additional points are worth stressing in the context of the insider agency problem. First, as previously noted, a surge in dividend payout is observed, prior to the SEO. This suggests that insiders try to extract maximum surplus before their anticipated dilution. Indeed, when the pre-issue payout ratio is included as a factor in the analysis, this paper detects an increase in the significance of insider dilution as an explanatory factor for both the negative announcement return and the subsequent deterioration in operating performance. Second, this paper evaluates the relative importance of other forms of insider compensation including salaries, bonuses and pensions and finds that all of these put together account for less than 40% of the potential wealth impact of equity dilution, justifying the focus on this particular agency problem. Third, while other research[38] based on a study of mainly industrial firms has shown that a convergence between CEO and firm leverage attenuates CEO moral hazard, these marginal effects are likely to be insignificant here, due to the huge gulf between insider and firm leverage that are part of the natural financial structure of the banks that are the focus of this paper. Overall, these factors support the intuition that the two main agency problems in the sample of this paper are those between shareholders and the government (dilution of the value of the deposit insurance guarantee) and those between inside and outside shareholders, and that other issues are either insignificant or irrelevant.

To summarize, the negative market reaction to involuntary bank equity issue announcements anticipates both a reduction in the bank's deposit insurance option value and an increase in insider agency costs. Increased capital appears to have the

[38] Sundaram and Yermack (2007)

expected beneficial effect of reducing risk-shifting incentives and thereby protecting taxpayer-supported deposit insurers. However, when implemented via forced recapitalizations that dilute insider ownership, minimum capital requirements also appear to have the adverse effect of exacerbating insider moral hazard. Increased agency costs lead to poorer bank performance over time and increased failure risk in the long run. While the benefits of capital regulation have long been appreciated, the findings in this paper illuminate a potential cost of such policies. This suggests that capital standards, to some degree, reduce bank failure risk by merely shifting some of that risk from the near term to future periods.

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Appendix 1: Insider Dilution and Total Compensation

This appendix studies whether the negative incentive effects from insider dilution are substantial relative to the other (positive) elements of insider compensation. These incentive effects are shown separately for cases with insider dilution and cases without insider dilution. Row 1 shows the number of observations; Row 2 shows the mean change in insider ownership as a percentage of the total ownership; Row 3 shows the mean change in the market value (in millions of dollars) of the insider shareholding resulting purely from the change in fractional ownership after the capital issue; Row 4 shows the mean total compensation of the insiders from salary and bonus (in millions of dollars); Row 5 calculates the mean percentage of total insider compensation from salary and bonus to the market value of the change in insider shareholding (Row 4 / Row 3, averaged over individual observations); Row 6 shows the total insider compensation comprised of the following: salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total; Row 7 calculates the mean percentage of total insider compensation including options granted to the market value of the change in insider shareholding (Row 6 / Row 3, averaged over individual observations); Row 8 restates the total insider compensation from Row 6 after substituting the total value of stock options granted (using Black-Scholes) with the net value of stock options exercised; and Row 9 calculates the mean percentage of total insider compensation including options exercised to the market value of the change in insider shareholding (Row 8 / Row 3, averaged over individual observations). All compensation data shown here were obtained from the Compustat Executive Compensation database.

		Insiders	
No.	**Statistic**	**Diluted**	**Undiluted**
1	Observations	6	2
2	Ownership Change (%)	-4.43	0.81
3	Market Value of Change in Insider Shareholding ($m)	-24.64	10.01
4	Total Compensation (Salary + Bonus, in $m)	2.43	20.20
5	Total Compensation (Salary + Bonus) / Market Value of Change in Insider Shareholding (%)	24.62	139.83
6	Total Compensation including Options Granted ($m)	3.57	27.65
7	Total Compensation including Options Granted / Market Value of Change in Insider Shareholding (%)	36.50	158.90
8	Total Compensation including Options Exercised ($m)	4.12	31.61
9	Total Compensation including Options Exercised / Market Value of Change in Insider Shareholding (%)	38.27	210.63

Appendix 2: Pre-Issue Dividend Payout History

This appendix shows the dividend history of the sample firms in the years leading up to and subsequent to the issue of capital.

	Average Dividend Payout Ratios			
Years	**Before Issue**	**Observations**	**After Issue**	**Observations**
1	61.69	75	27.34	74
2	31.42	75	23.81	73
3	30.33	75	64.66	67
4	43.22	72	45.61	64
5	30.55	68	35.24	62
6	41.06	61	52.31	51

Period	**Change in Average Dividend Payout Ratio**	**Observations**
From 2 to 1 year before issue	30.27	75
5-year average from 2 to 1 year before issue	27.67	75

Appendix 3: A Model of Cumulative Abnormal Returns (With Changes in Pre-Issue Dividend Payout)

This appendix replicates the results in Table 4 using changes in the dividend payout ratio instead of the payout ratio itself.
Model: $\boldsymbol{CAR_{i,[T_1,T_2]} = a + b_1 IOC_{i,[T_1,T_2]} + b_2 OVC_{i,[T_1,T_2]} + b_3 UDR_{i,T_1} + b_4 TA_{i,T_1} + b_5 RLSZ_{i,T_1} + b_6 BM_{i,T_1} + b_7 LCR_{i,T_1} + b_8 CDI_{i,T_1} + b_9 OPD_{i,T_1} + b_{10} BHC_{i,T_1} + b_{11} PRC1_{i,T_1} + b_{12} PRC2_{i,T_1} + \varepsilon_i}$ where $\boldsymbol{CAR_{i,[T_1,T_2]}}$ is the $\boldsymbol{i}^{th}$ bank's cumulative abnormal return over the event window **[*T₁*, *T₂*]**; ***IOC*** is the announcement date percentage change in insider ownership; ***OVC*** is the announcement date relative change in the deposit insurance guarantee value; ***UDR*** is the uninsured/total deposits ratio; ***TA*** is total assets; ***RLSZ*** is the issue size/total assets ratio; ***BM*** is the book-to-market ratio; ***LCR*** is the loan commitments/total loans ratio; ***CDI*** (average) is an index of capital deficiency; ***OPD*** is the offer price discount; ***BHC*** is a dummy that is valued at 1 for a bank holding company and 0 for a bank; ***PRC1*** is the change in the payout ratio from 2 years before the issue to 1 year before the issue; ***PRC2*** is the change in the payout ratio from the average level over years 2-6 before the issue to 1 year before the issue, and ***UDR***, ***TA***, ***RLSZ***, ***BM***, ***LCR*** and ***BHC*** are pre-announcement values. The last two columns show the error degrees of freedom and the adjusted R^2 (%), respectively. The symbols *, ** and *** denote significance at the 90%, 95% and 99% levels, respectively, for the null hypothesis that the coefficient equals zero in each case. Intercepts are not shown and coefficients are multiplied by 10,000 for readability. Similar results for the CAR against the KBW Bank Index are available on request.

IOC	OVC	UDR	TA	RLSZ	BM	LCR	CDI	OPD	BHC	PRC1	PRC2	EDF	Adj. R^2(%)
Dependent Variable: CAR in the Window [2,0] before the Announcement Date													
2.79***	73.80**	331.71	-0.003	-132.13	-328.47***	-1122.23**	576.89	612.90***	409.66**	1.51***		52	18.92
2.82***	72.06**	311.52	-0.004	-132.00	-345.72***	-1132.44**	543.83	628.98***	404.25**		1.53***	52	17.82
Dependent Variable: CAR in the Window [1,0] before the Announcement Date													
2.37**	85.13**	732.80*	-0.001	-521.35*	-224.53**	-1342.44***	1512.61*	387.94*	231.79	0.82		52	18.95
2.43**	84.27**	717.41*	-0.001	-524.30*	-243.80**	-1350.01***	1490.75*	405.44*	233.19		0.90*	52	19.31
Dependent Variable: CAR on [0,0] the Announcement Date													
1.82	93.65**	986.93**	0.004*	-203.97	-68.40	-1239.38***	1117.64	-62.94	275.82	-0.22		51	10.11
2.05*	94.42**	969.46**	0.003	-218.17	-110.43	-1247.87***	1103.90	-26.02	295.91		0.10	51	9.85