The Stock Market and Bank Risk-Taking

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September 2023

Forthcoming, *Journal of Finance*

Abstract

Using confidential supervisory risk ratings, we document that banks increase risk after they go public compared to a control group of banks that filed to go public but withdrew their filings for plausibly exogenous reasons. The increase in risk increases short-term performance at the expense of long-term performance. The increase in risk stems from increased pressure to maximize short-term stock prices and earnings once the bank is publicly-traded. After going public, banks that are owned by investors that place greater value on short-term performance increase risk more, and those managed by CEOs with more short-term compensation also increase risk more.

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1. Introduction

A basic premise of bank regulation and supervision is that banks have incentives to take too much risk. Yet we know relatively little about these incentives. Some have tied risk-taking to management compensation that is structured so that managers benefit from good performance but bear only a small share of the costs of bad performance (Bolton, Mehran and Shapiro, 2015; and Bebchuk, Cohen and Spamann, 2010). Others have argued that explicit or implicit government guarantees of bank debt and deposits enable banks to take risks without bearing their full social cost (Kane, 1985 and Pennacchi, 1987). Still others have suggested that behavioral biases lead financial firms to neglect the risk of adverse tail outcomes (Gennaioli, Shleifer and Vishny, 2012).

In this paper, we explore the role of the stock market in risk-taking by banks. Our focus on the stock market is motivated in part by the observation that the growth of the U.S. banking sector over the past 25 or so years was concentrated among publicly-traded banks, as can be seen in Figure 1. We start by showing a causal effect of public stock market ownership on risk-taking. We document that when banks go public they increase the risk of their assets and liabilities relative to a control sample of banks. They do so in ways that are both observable and unobservable to the stock market.

A straightforward explanation of this increase in risk is that, by going public, banks attract a more diversified set of shareholders who have greater risk-bearing capacity than the owner-managers of privately-held banks. Another explanation is that publicly-traded banks can tolerate more risk because they have greater access to equity financing and thus can more easily recover when risks materialize.

These are both plausible explanations of our finding, but we argue there is more to the story. In particular, we argue that publicly-owned banks are subject to the pressures of "short-

termism," which leads executives to weigh the impact of their decisions on short-term earnings and short-term stock prices, possibly at the expense of long-run value. Short-termism is typically associated with *less* risk-taking in nonfinancial firms, as risky long-term projects like R&D lower short-run earnings. But, in banking, the easiest way to increase short-run earnings is to take *more* risk. For example, banks can increase earnings by loosening lending standards, enabling them to make more loans and earn higher yields, but leading to higher default rates in the longer run. They can also increase earnings by using more wholesale short-term funding, which lowers current funding costs but increases future rollover and run risk.

The prediction that short-termism induces banks to take more risk follows from the logic of Stein's (1989) model of short-termism. In his model, stock-market investors rationally attribute higher current earnings in part to a permanent shock to earnings and in part to a transitory shock. Because earnings embed news about long-run value, stock prices rise on the announcement of higher earnings. Thus, managers who care about the short-term stock price – perhaps because of compensation, perhaps because of pressure from institutional shareholders – have incentives to cut hard-to-observe investments that increase short-term earnings, even at the expense of long-run earnings and value. In banking, this means that managers take hard-to-observe risky actions that increase current earnings, even if doing so is not profitable in the long run because it increases future credit and funding problems.

While Stein (1989) offers a model of short-termism in a perfectly rational but imperfectly informed stock market, there is a more behavioral explanation of short-termism in which stock market investors over-extrapolate current earnings into the future, as documented by La Porta (1996). In this case, managers will have incentives to boost earnings by taking more risk

because investors over-extrapolate earnings and fail to understand that these higher-risk earnings are less likely to be sustained.

To test the impact of short-termism on risk-taking, we estimate the change in a bank's risk after it goes public in an initial public offering (IPO). One difficulty with adopting a causal interpretation of this finding is that the factors that give rise to the IPO in the first instance could be correlated with a change in the environment that increases risk or the incentive to take risk. For example, a bank might go public in response to growth opportunities associated with population and business expansions that increase the demand for residential and commercial mortgages. But these growth opportunities could also be associated with a riskier economic environment.

To address this identification challenge, we use a difference-in-differences (DD) approach, in which we compare the change in risk of banks that go public (the treatment group) to those that intended to go public but withdrew their registration to go public (the control group). The idea here – following Seru (2014) and Bernstein (2015) in their work on innovation – is to compare the treatment group to a control group whose decisions were likely driven by the same factors. For example, if both groups wanted to go public to exploit growth opportunities in a riskier environment, then comparing these groups should alleviate the concern that the treatment group faces a substantially different environment than the control group.

Using this identification strategy and confidential safety and soundness ratings as assessed by bank supervisors, we show that after banks go public they experience a deterioration in their supervisory ratings – the so-called "composite" CAMELS ratings – relative to a control group of

banks that cancelled their IPOs.[2] Further, we document that there are no significant differences in pre-treatment trends in CAMELS ratings, and treated and control banks appear to be well-balanced along key pre-treatment covariates that may affect risk. The effect of going public is economically significant: on average, going public increases risk by about one-half of a standard deviation of the CAMELS rating, and it increases the likelihood of a weak rating by as much as the unconditional mean likelihood that a bank is rated as weak in the sample. Thus, the effect of going public meaningfully increases the likelihood that the bank has a material weakness in its risk profile according to supervisors.

While our main identification approach involving cancelled IPOs goes some distance in dealing with endogeneity concerns, it is still possible that deal cancellations are correlated with factors related to bank risk. Therefore, we follow Bernstein (2015) by instrumenting for deal completion with an index of stock returns in the two months after the deal is announced. Deals are more likely to be cancelled when banking industry stock returns are low in this two-month window. Under the assumption that banking industry stock returns over this short window are uncorrelated with longer-term, bank-specific risk-taking incentives, the predicted value of this first-stage regression should be purged of the component of deal failure that could be correlated with risk-taking incentives. Indeed, we find that the results hold up using this instrumental variables approach. Furthermore, we show that when privately-held banks are acquired by publicly-owned banks, they increase risk relative to banks that are acquired but whose public ownership status does

[2] In order to better focus on the build-up of risk before the financial crisis of 2007-2009, in all our baseline tests we examine a ten-year window leading up to the crisis (1997-2006)

not change, i.e. when private banks are acquired by other private banks or public banks are acquired by other public banks.

We next look in more detail at the way banks increase risk. We show that banks increase the risk of their assets as measured confidentially by supervisors both in asset quality (as measured by the "A" in the CAMELS rating) and in loan-level risk ratings from the Federal Reserve's Survey of Terms of Business Lending (STBL). This increase in risk is also evident in an observable shift into riskier asset classes and loan types. We also show that banks increase funding risk. Supervisors rate newly public banks as having less capital adequacy (the "C" in CAMELS) and as being less liquid (the "L" in CAMELS). This deterioration in confidential supervisory ratings is consistent with an observable reduction in Tier 1 capital and increased reliance on less stable sources of funding. Thus, banks increase risk once going public in both publicly observable and unobservable measures of risk.

We show that the deterioration in confidential supervisory ratings is not completely explained by the increase in observable measures of risk; banks increase risk after going public in ways that are not observable to outsiders, including stock market investors. This finding is consistent with the Stein (1989) model of short-termism in which firms try to influence the stock market's assessment of long-run earnings through unobservable actions that increase earnings in the short run. Thus, for example, one would not expect a fully-rational stock market to forecast an increase in risk-adjusted long-run earnings as banks shift into riskier assets, and thus such a shift would not result in a higher stock price. However, if banks also reduce asset quality in hard-to-observe ways that also increase short-run earnings, this reduction in asset quality could influence market expectations of long-run value. As described in the Appendix, the supervisory asset quality rating includes assessments of loan loss allowances, the diversification of the loan portfolio, and

underwriting standards all of which can influence risk and earnings in unobservable ways. Note, however, that the short-termism explanation of the findings does not depend on there being unobservable actions that increase risk and earnings if stock-market investors over-extrapolate earnings.

The short-termism explanation of the increase in risk following a transition to public ownership implies that earnings should increase in the short-run, followed by a subsequent decrease in earnings as risks are realized. While this pattern in earnings is consistent with other explanations of an increase in short-term risk, if we find no such pattern in the data it argues against the short-termism explanation. Indeed, we find that return on equity initially increases after banks go public, but then falls in the longer run. And we find that banks do not increase their loan loss provisions in line with the increase in the risk of their loans; this under-provisioning in turn increases short-run earnings. Finally, we document that there is a deterioration in the supervisory rating of earnings quality (the "E" in CAMELS). This rating explicitly considers not just the level of earnings but also its long-term sustainability.

While the findings discussed so far are consistent with short-termism driving the increase in risk of banks transitioning to public ownership, the explanation would be strengthened by more direct evidence. To this end, we examine whether the increase in risk after banks go public is more pronounced in banks that are more focused on the short-term earnings and stock price performance. We document that the increase in risk after going public is larger for banks owned by institutional investors that turn over their shares more rapidly and for banks that emphasize short-term performance metrics in their earnings calls and annual reports. Banks with more option-based compensation, particularly if it is of short-duration, also increase risk by more.

To examine whether our findings could be explained by an increase in risk-bearing capacity after banks go public, we explore whether the results hold in sub-samples where risk-bearing capacity likely does not change appreciably. These subsamples include: (i) banks that do not diversify by acquiring other banks; (ii) banks in which insiders do not sell large amounts of their shares around the time of the IPO; (iii) banks that do not raise a lot of equity at the time of the IPO; and (iv) banks that do not subsequently issue significant amounts of equity. In all of these subsamples, banks increase risk-taking activity post-IPO despite the relatively modest increase in risk-bearing capacity.

Finally, we explore the broader implications of our analysis. First, we show that the change in risk-taking as banks transition to public ownership results in greater risk publicly-owned banks than at privately-owned banks. Interestingly, prior research has not been able to document this fact because it focuses on ex-post realizations of risk, which are infrequent, whereas we focus on ex ante measures of risk, namely supervisory CAMELS ratings. Second, we show that banks that transitioned to public ownership prior to the financial crisis of 2007-2009 performed more poorly than those that did not. This suggests that the risk-taking incentives that come with short-term stock market pressures could reduce bank resilience during financial crises.

The remainder of this paper is organized as follows. Section 2 describes the data and motivating theory. Section 3 presents the basic finding that banks increase risk when they go public and attempts to establish that this is a causal relationship through our DD approach. Section 4 introduces cross-sectional evidence and several additional tests in an attempt to better understand the mechanism underlying our findings. Section 5 concludes.

2. Data

To construct the sample, we start with the universe of U.S. depository institutions that are owned by a bank holding company (BHC) and have non-missing information on total assets as reported to regulators in the Reports of Condition and Income ("Call Reports") between 1990 and 2012.

2.1. Information on Bank Risk-Taking

Our main risk measure is based on confidential supervisory information from the National Information Center (NIC) of the Federal Reserve System. The NIC dataset covers all on-site examinations of safety and soundness conducted by banking regulators. These examinations generate six "component" ratings – Capital Adequacy, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk – and an overall "composite" CAMELS rating. Each of these component ratings ranges between a value of 1 and 5, with a component rating of 1 or 2 considered "strong" and a component rating of 3, 4, or 5 considered "weak." A weak component rating indicates that the bank has material issues with risk related to the component. An advantage of using supervisory ratings in our analysis is that they capture an ex-ante aspect of bank risk-taking in that they are designed to rate the ability of management to identify, measure, monitor and control each of the risks. Another advantage is that the CAMELS ratings are not observed by outside investors and, as such, can be seen as a proxy for the kind of hard-to-observe actions that are the basis for the Stein (1989) model of short-termism. Ratings are also unlikely to increase mechanically after IPO because supervisors are not explicitly instructed to assign the ratings based on public listing status (see Commercial Bank Examination Manual and the Appendix for more details). In fact, if risk increases along with an increase in risk-bearing capacity – for example because of greater access to financing or an increase in diversification – CAMELS should either

not change or may even improve because supervisors are instructed to evaluate not just risk, but also the bank's capacity to bear risk.

We complement the CAMELS data with confidential information on loan-level risk from the Federal Reserve's Survey of Terms of Business Lending (STBL), which is available for the 1997 to 2012 period.[3] (See Berger, Kashyap, and Scalise (1995) for an early study that uses STBL and DellAriccia, Laeven, and Suarez (2017) for a more recent study that uses this loan risk rating.) The survey asks participating banks about the terms of all commercial and industrial (C&I) loans issued during the first full business week of the middle month in every quarter. Banks report the risk rating of each loan by mapping their internal loan risk ratings to a standardized scale defined by the Federal Reserve. Loan risk ratings vary from 1 to 5, with 5 representing the highest risk. Ratings are audited by the Federal Reserve periodically to ensure that they are correctly mapped into the standardized risk categories, which should alleviate concerns that there is a reporting bias. Further, since we include bank fixed effects in much of our analysis, persistent bank-specific bias in the risk assessment should be absorbed by the fixed effect. To more cleanly identify changes in risk-taking, we exclude previously-originated loans from the sample and focus on newly originated loans.

In addition to supervisory risk data, we use Call Reports to construct a set of risk measures based on the composition of asset portfolios, the level of bank capital, and the maturity structure of bank liabilities. The definitions of the variables used in the analysis are in the Appendix. We

[3] The STBL is a quarterly survey on the terms of business lending of a stratified sample of about 400 banks conducted by the U.S. Federal Reserve, which typically covers a very large share of assets in the U.S. banking sector. For example, the combined assets of the banks responding to the survey for the fourth quarter of 2011 represented about 60 percent of all assets of U.S. commercial banks. The publicly available release of this survey encompasses an aggregate version of the terms of business lending, reported by bank type. In this paper, we use the confidential micro data. Section 2 of DellAriccia, Laeven, and Suarez (2017) covers additional details on the STBL data and a full list of references of papers that used it.

conduct our main analysis at the level of the depository institution because it is the most granular level at which CAMELS ratings are available, but we show that the results hold at the bank holding company level in the robustness analysis. In what follows, as a shorthand, we will refer to depository institutions as "banks" even though there are banks (such as investment banks) that are not depository institutions.

2.2. Information on Private-to-Public Transitions

To construct our sample of banks that transition to public ownership, we use the NIC data and several other standard sources of historical information on BHC stock listing status. From the NIC data, we retrieve the full history of top-tier bank holding companies of each subsidiary bank. We determine whether a BHC is publicly traded using historical stock market listing information from the New York Fed CRSP-FRB link database, as well as data on all IPO filings of financial firms (SIC codes between 6000 and 6999) from Thomson Financial's SDC New Issues database, Capital IQ Key Developments database, and SNL Financial Capital Offerings database. This process leads to a final merged BHC-bank sample running from 1990-2012 of 178,980 bank-quarter observations for 7,166 (3,251) unique banks (BHCs) whose historical stock listing status we are able to confirm.

The main identification sample used in the analysis – which we refer to as the "Announced IPOs Sample" – is composed of all banks in the merged BHC-bank sample that announce an initial public offering (IPO) sometime during the 1990-2012 period. We construct two sub-samples of these announced transitions. The first is composed of announced IPOs that are completed. This sub-sample serves as the treatment group in our baseline identification strategy and includes

15,411 bank-quarter observations involving 406 (206) unique banks (BHCs) during the 1990-2012 period.[4]

The second sub-sample is composed of banks that initiated the IPO process but chose not to complete the IPO. This sub-sample serves as the control group in our baseline identification strategy. After submitting an initial registration statement to the SEC (usually Form S-1) to announce their intention to go public, filers have the option to withdraw the IPO filing by submitting the SEC's Form RW during the IPO marketing period (the "book-building" phase). To identify withdrawn IPOs, we flag the filings that are classified as withdrawn from the lists of all IPO filings contained in the three sources detailed above. IPO filing withdrawals are common, as approximately 25 percent of all announced bank IPOs are ultimately not completed, in line with the 20 percent IPO withdrawal rate reported by Bernstein (2015) in his study of R&D-intensive firms. The control group consists of 122 (74) banks (BHCs) that withdrew their IPO application, yielding 2,343 bank-quarter observations. Table 1 presents summary statistics of the main identification sample, which is composed of IPO announcements by 538 (276) unique banks (BHCs) that are either completed or withdrawn, yielding 17,754 bank-quarter observations between 1990 and 2012 (Column 2).[5]

Table 1 also presents summary statistics for an alternative sample, the "Completed M&As Sample," which we use as a robustness check for the main analysis (Column 3). This sample is composed of acquired banks, yielding 21,757 bank-quarter observations for 1,631 (1,089) banks

[4] This sample excludes transaction involving failed banks that were under FDIC receivership or had a CAMELS rating of 5 at the time of the announcement.

[5] While the early 1990s and the post-crisis period were both times of cold IPO activity, IPO announcements are generally evenly distributed over the 10-year period running up to the crisis, which is the time-period used in the identification analysis (see Section 3.1).

(BHCs) between 1990 and 2012.[6] Here the treatment group consists of acquisitions of a private bank by a public bank, thereby transitioning a private bank to public ownership. The control group consists of acquisitions that do not transition private banks to public ownership either because they involve a private bank that is acquired by another private bank or a public bank that is acquired by another public bank.

3. Identifying the Effect of the Stock Market on Bank Risk-Taking

We are interested in identifying the causal effect on bank risk of a transition from private to public ownership. One concern with comparing risk before and after private-to-public transitions is that such ownership changes could be endogenous and correlated with opportunities to take risk. For example, in response to an increase in risk, the owner-manager of a privately-owned bank may choose to take the bank public to diversify risk or raise capital to enhance resilience in a riskier environment. If the IPO is associated with an increase in risk, the estimated effect of going public on bank risk would be biased upwards and would not have a causal interpretation.

3.1. Empirical Framework

To address this identification challenge, we use a difference-in-differences (DD) approach in which we compare the change in risk of banks that go public in an IPO (the treatment group) to the change in risk of banks whose IPO filings were cancelled (the control group). The idea here – following Seru (2014) and Bernstein (2015) in their work on innovation – is to compare the change

[6] We identify transitions due to acquisitions using the Merger Table from the NIC data, which keeps a full historical record of dates and identities of target and acquirer banks. We are able to track the ratings of a bank after it has been acquired because acquired banks often remain legally distinct companies that must still submit their own regulatory filings and thus retain their identifiers.

in the risk of banks in the treatment and control group whose attempts to go public were plausibly driven by the same factors. Comparing within-bank changes in risk of treated banks to those of relatively similar banks in the control group should help to alleviate the selection concerns described above. Of course, it is important that the reason that the deal is withdrawn is not correlated with a change in the bank's risk environment, an issue we take up in Section 3.3 below.

More formally, to examine the effect of going public on bank risk, we use the following baseline DD regression specification:

$$RISK_{it} = \beta_1 \times After_{it} + \beta_2 \times After_{it} \times Treatment_i + \gamma \times Z_{it} + \mu_t + a_i + \varepsilon_{it} \qquad (1)$$

where *i* and *t* index banks and year-quarters respectively. *RISK* is measured initially by supervisory ratings and then by balance sheet measures of risk. *After* is an indicator variable that takes a value of one for all the bank-quarters after the IPO announcement date and zero otherwise, and *Treatment* is an indicator variable that takes a value of one for banks in the treatment group of completed IPOs and zero for those in the control group of cancelled IPOs. Z_{it} controls for bank-level covariates of risk and, in the baseline specification, is measured as bank size (total assets), while μ_t and a_i are year-quarter dummies and bank fixed effects, respectively. The inclusion of bank size, as well as bank and time fixed effects means that our estimates compare the (within-bank) response of risk measures for treated banks to that of similarly-sized control banks in the same year-quarter. We evaluate statistical significance using robust clustered standard errors adjusted for non-independence of observations within BHCs.[7] In order to better focus on the build-up of risk before the financial crisis of 2007-2009, in all our baseline tests we examine a ten-year window leading up to the crisis (1997-2006). Focusing on the pre-crisis period helps to ease the potential

[7] We verify that the results are robust to clustering by bank.

concern that changes in supervisory standards after the crisis may be driving our results.[8] The null hypothesis is that the coefficient of interest, β_2, which captures the effect of changes in stock listing status on bank risk, is equal to zero.

Before reporting our baseline findings for the DD estimation, we present comparisons of the treatment and control groups prior to the announced IPOs. Table 2, Panel A shows that average bank size is the only difference between treatment and control groups, with banks in the treatment group being larger on average than those in the control group. But other balance sheet ratios – including the Tier 1 capital ratio, deposits to assets, and loans to assets – are essentially the same across the two groups. Importantly, there is no difference in the average CAMELS ratings and the year-to-year change in CAMELS ratings prior to the IPO announcement. We also compare the treatment and control banks for the sample of banks that are acquired. As shown in Panel B the only difference between treated and control banks is also size. The size difference between treatment and control banks is another reason to include bank size as a covariate throughout the analysis.

3.2. Baseline DD Estimates

Table 3 reports the results from estimating our baseline DD regression (1) in the IPO sample for the overall supervisory risk rating (Panel A, Column 1) and for the indicator of risk based on whether the overall rating is considered "weak" by supervisors (Panel A, Column 2). For both risk measures, the estimates indicate that after going public there is a deterioration in a bank's

[8] Another related concern is that switching to public status could change the bank's supervisor from one regulator to another. To address this concern, we control for the effects of new supervisors by including fixed effects for the regulatory agency that provides the supervisory assessments in all the specifications.

supervisory ratings relative to a similarly-sized bank that attempts an IPO but does not complete it. The estimated 0.316 increase in the CAMELS rating after a bank goes public is a sizable effect that corresponds to about half of a one standard deviation movement in the (within-bank) distribution of the ratings.[9]

In Column 2, the dependent variable is the "Weak CAMELS" indicator, which takes the value one if the composite CAMELS rating is weak (3 or higher). The estimated 0.088 increase in the likelihood of a weak rating following IPO also implies a sizable effect that is about as large as the unconditional sample mean likelihood that a bank is considered weak. Thus, the effect of going public is not just to move banks from being very safe (rating of 1) to somewhat less safe (rating of 2), but it meaningfully increases the likelihood that the bank has a material weakness in its risk profile from the safety and soundness perspective of supervisors.

Figure 2 shows the results of a graphical analysis in which we plot a dummy for the Weak CAMELS indicator (3 or worse) in event time leading up to and after the year when a bank announces its IPO. In line with our baseline estimates, there is a sharp increase in the likelihood that a treated bank receives a weak CAMELS rating beginning right after the announcement (t=+1), but there is no change for banks in the control group.[10] The likelihood that a treated bank receives a weak CAMELS ratings continues to increase in the subsequent years (t = +2 to t=+4). Consistent with the evidence presented in Table 2, there are no meaningful trends in this variable

[9] Since our DD specification includes bank fixed effects, we use the within-bank distribution (i.e., the distribution after removing bank fixed effects) as the benchmark.

[10] The estimates for t=+1 to t=+4 are statistically significant for the treatment group but not for the control group. For statistical significance of the before vs. after dummy in the treated and control groups see Appendix Table A1, Panel A (Columns 1-2).

in years prior to announcement (t=-1 to t=-5) and little difference in the levels for the treated and control banks during the pre-treatment period.

3.3. Robustness and Sensitivity Analyses

Next, we provide four sets of robustness and sensitivity checks on the baseline estimates from specification (1).

3.3.A. 2SLS-IV Estimates to Refine Identification

In this section, we address the concern that IPO cancellations (used in our baseline DD estimation) could be correlated with factors related to bank risk, thus leading to a selection bias in the estimates. We follow the approach of Bernstein (2015), which instruments for deal completion with an index of stock returns in the two months after the deal is announced. We assume that stock returns over this short window are correlated with the value of going public but uncorrelated with longer-term risk. Under this assumption, the predicted value of this first-stage regression should be purged of the component of deal failure that could be correlated with changes in the risk environment. Specifically, we estimate the following 2SLS-IV specification:

$$RISK_i^{Post} = \beta_1 \widehat{Completed\ IPO}_t + \gamma_1 RISK_i^{Pre} + \gamma_2 Z_i + \mu_t + \varepsilon_t \qquad (2)$$

where $RISK_i^{Post}$ is the average bank risk proxy in the quarters after the announcement date, $RISK_i^{Pre}$ is the corresponding average in the quarters prior to the announcement,[11] and $\widehat{Completed\ IPO}$ is the predicted probability that the IPO occurs. This predicted probability of deal completion is estimated from the (first-stage) regression,

[11] All available quarters in the sample period after and before the announcement date are included.

$$Completed\ IPO_i = \beta_2 S\&P Bank\ Returns_i + \gamma_3 Z_i + \mu_t + \varepsilon_i \quad (3)$$

where we are using the S&P Bank Index returns in the two months following each announcement as the instrument.[12] The exclusion restriction is that the variable *S&P Bank Returns* is uncorrelated with bank risk decisions in the years following the IPO.

Panel B of Table 3 reports the 2SLS-IV estimates in the IPO sample for the overall supervisory CAMELS ratings (Column 1) and for the Weak CAMELS indicator (Column 2). After instrumenting IPO completion with our stock return measure, transitioning to public ownership continues to be associated with a significant deterioration in banks' supervisory ratings.[13] It is reassuring about the validity of the instrument that if measured over a different time period (after the IPO outcome, a year before the announcement, or a year after the announcement) the index of stock returns does not predict the composite CAMELS ratings after the announcement. Since bank index stock returns over these time periods do not affect the likelihood that the IPO occurs, the evidence from this placebo test corroborates the exclusion restriction that the instrument affects bank risk only through its impact on whether the bank goes public. (See Appendix Table A.3.)

3.3.B. Validation using Merger-Related Private to Public Transitions

We now examine an alternative sample of privately-owned banks that transition to public ownership because they are acquired by a publicly-owned bank holding company. The control group for this sample is composed of banks that are also acquired, but do not change their

[12] Appendix Table A.3 shows that the instrument has predictive power in the first stage, as deals announced when the bank stock index performs poorly are less likely to be completed. This is evident in Panel A, where we show that deals are less likely to be completed when index returns are in the bottom quartile rather than the top quartile. The remaining panels of Table A.3 show results of the placebo tests that corroborate the exclusion restriction.

[13] For example, the estimates in Column 1 of Panel B show that there is an increase in the composite CAMELS rating of 0.247, which is strongly statistically and economically significant and close in magnitude to our baseline DD estimates in Column 1 of Panel A.

public/private status because they are either private banks that are acquired by other private banks or are public banks that are acquired by other public banks. Bloom, Sadun, and Van Reenen (2012) use a similar approach to estimate the productivity effect of transferring ownership to a U.S. multinational firm.

The results shown in Panel A of Table 3 (Columns 3 and 4) indicate that banks increase risk after a merger-related transition to public ownership. While the estimated effects in the merger sample are somewhat smaller than those in the IPO sample, they are still strongly statistically significant. Note that in these regressions we control for the size of the acquirer and target.

The identifying assumption in this approach is not that targets in the treatment and control groups are the same as other banks. Rather it is the milder assumption that while targets of an acquisition could face an increase in the risk environment, this increase does not depend on the type of ownership change (i.e., private to public, private to private, public to public). As previously noted, Panel B of Table 2 corroborates the assumption, as there are no differential pre-trends in ratings for the treatment and control groups. There are also no meaningful differences in the attributes of treatment and control groups other than size, which is included in the regressions as a control. Moreover, this approach differences out potential confounds from other channels that plausibly increase risk for both the treatment and the control group for reasons other than the transition to public ownership. While a large literature in banking finds that acquisitions do indeed lead to changes in bank behavior,[14] as long as these changes do not *differentially* impact treated and control groups, the estimated effect will not be biased. Overall, the results of this robustness

[14] See, for example, Erel (2011) for evidence that acquisitions affect loan prices and Bliss and Rosen (2011) for evidence on the impact on CEO compensation.

test suggest that our findings are not simply an artifact of a particular type of private-to-public transition.

3.3.C. Additional Sensitivity Checks

Our baseline estimates are little changed if we match the treatment group to the control group of banks based on the time at which the transition announcement occurs and on (pre-treatment) size and composite CAMELS rating. (See Panel B of Table 3, Columns 3 and 4.) This matched-sample DD approach (Heckman, Ichimura, and Todd, 1997) addresses the potential concern that our linear controls for size in the DD analysis may not fully capture non-linear relationships between size and the change in risk after transition.[15] Moreover, the estimated impact of private-to-public transitions remains strongly significant both statistically and economically across an additional battery of sensitivity checks on the baseline specification (1). These tests include the following: (a) Matching just on time and prior CAMELS rating or using a different control group for matching, which comprises all private banks in the merged BHC-bank sample; (Columns 3 and 4 of Appendix Table A.1.) (b) Adding to the specification higher order functions of size to better control for differences between very large and very small banks; (Column 1 of Appendix Table A.2.) (c) Using a threshold of 4 to define the Weak CAMELS indicator, either for the overall rating or for any of the component ratings, to further corroborate the claim that transitions lead to material weaknesses in risk as assessed by supervisors; (Columns 2 and 3 of Appendix Table A.2.) (d) Using the rating at the BHC level, to ensure that the effect on commercial banks' risk carries over to the BHCs that hold them (Column 4 of Appendix Table A.2); (e) Using a shorter time window around the announcement (Column 5 of Appendix Table A.2).

[15] See the table for more details on the matching procedure.

3.4. DD Estimates Using Granular Supervisory Ratings

Our evidence so far indicates that there is an increase in the overall supervisory risk measure after an IPO and after a privately-owned bank is acquired by a publicly-traded BHC. Next, we explore *which* risks increase by examining in more detail how the risk of bank assets and liabilities change when private banks transition to public ownership. Panel A of Table 4 reports the effects on asset risk and Panel B reports the effects on liability risk.

As can be seen in Panel A of Table 4, according to supervisory ratings, overall "Asset Quality" – the "A" in CAMELS – deteriorates when banks transition to public ownership (column 1 for the IPO sample and column 3 for the M&A sample). According to the Commercial Bank Examination Manual, Asset Quality "reflects the quantity of existing and potential credit risk… [and] the ability of management to identify, measure, monitor and control credit risk." Thus, this measure of risk goes beyond being a simple measure of credit risk, but rather also measures the processes in place that enable a bank to manage credit risk. The estimated effect of an IPO on Asset Quality is sizable: on a scale of 1-5, asset risk goes up by 0.316, which is about half of the within-bank standard deviation. This increase in risk is also reflected in an increase in the risk of new C&I loans. As shown in columns 2 (IPO sub-sample), the STBL risk rating increases by 0.403, which is about as large as the within-bank standard deviation. In the acquisition sample, the estimates are smaller but remain economically significant for both outcomes at about a quarter of their within-bank standard deviation (columns 3 and 4).

The results in Panel B of Table 4 indicate that, according to supervisory ratings, the liability side of bank balance sheets also become riskier after banks transition to public ownership. In columns 1 (IPO Sample) and 3 (M&A Sample) the dependent variable is the maximum of the

capital adequacy rating (the "C" in CAMELS) and the liquidity rating (the "L" in CAMELS), where higher values of these ratings correspond to weaker ratings. The regressions indicate a deterioration in this combined measure following IPO and merger. Columns 2 and 4 show the effect of private-to-public transitions on the Sensitivity to Risk rating, which measures sensitivity of capital and earnings to market risk, including interest rates, foreign exchange rates, and commodity prices, and equity prices. This measure of risk also deteriorates. See the Appendix for a detailed description of these supervisory risk measures.

3.5 DD Estimates Using Balance Sheet Measures of Risk

So far, we have used supervisory risk assessments to measure the impact of public ownership on risk. It is possible that supervisors implicitly rate banks as riskier simply because they are owned by publicly traded holding companies. There is nothing in supervisory guidelines to suggest that this is the case, but one way to address this concern is to look at the change in balance sheet measures of risk after banks transition to public ownership.

To this end, Table 5 Panel A reports the change in two asset-side measures of risk. The first is risk-weighted assets divided by total assets (RWA/A). This ratio will increase to the extent that (i) banks shift their loan portfolio into riskier loan types (e.g. secured first-lien mortgages into second-lien mortgages); (ii) shift their securities portfolio into riskier securities (e.g. Treasuries with their risk weight of zero and into Agency mortgage-backed securities with their risk weight of 20%); or (iii) shift their assets from securities (which tend to have low risk weights) into loans (which tend to have higher risk weights). The first and third columns (IPO and M&A Samples) show that RWA/A does increase after a public transition for the treated banks relative to their

control banks. The table also shows in columns 2 and 4 that the treated banks tended to shift into residential real estate loans. This occurs during the period leading up to the housing-driven financial crisis of 2007-9, and thus reflects a buildup of real-estate related risk in the assets of treated banks.

Panel B of Table 5 tells a similar story about risk on the liability side of the balance sheet. Tier 1 capital declines in both samples (columns 1 and 3). In addition, banks become more reliant on less stable sources of funding (columns 2 and 4). These less stable funding sources, captured in our Volatile Liabilities measure, include large denomination certificates of deposit and repurchase agreements.

We have shown the risk increases when banks transition to public ownership using measures of risk based on supervisory ratings and balance sheet variables. It is natural to ask whether the deterioration in supervisory risk ratings simply reflects the observable increase in balance sheet risk. The results in Table 6 suggest that the answer is no. Columns 1 and 2 of the table show that after controlling for balance sheet measures of risk examined in Table 5 – total assets, risk-weighted assets relative to total assets, the residential real estate share of total loans, Tier 1 capital and volatile liabilities – the overall CAMELS measure of risk for treated banks and the weak CAMELS indicator both deteriorate in the IPO sample. The observable measures of risk are generally not statistically significant in these regressions, and the main coefficient of interest is not affected much. Columns 3 does the same basic analysis for the asset risk measure, including the asset risk balance sheet measures as a control. Columns 4 and 5 repeat the analysis for the two liability-side measures of risk, and include only the liability side measures of risk as controls in the regression. In these regressions as well, risk still increases despite including the controls, although in this case the controls are significantly related to the supervisory ratings. These findings

lend support to the Stein (1989) short-termism story in the sense that banks seem to take risk-increasing actions that investors cannot readily observe and that cannot be predicted from observable measures of risk.

4. Interpreting the Effect of the Stock Market on Bank Risk-Taking

One interpretation of the main results is that public listing increases risk because banks face more pressure to pump up short-term earnings and impress the market after they go public, as would be implied by the short-termism model of Stein (1989) or a behavioral model based on the over-extrapolation of earnings. The most basic implication of this model is that distortions should be greatest when the concern with impressing the market is most pronounced – i.e., when firms place a higher weight on current stock prices. Under this interpretation, transitions from private to public status involve a change from a regime where banks do not face market pressure to one where they do.

While the basic fact that banks increase risk after transitioning to public ownership is consistent with the short-termism, there are other potential explanations of the increase in risk. In particular, it is possible that after banks transition to public ownership their shares are held by more diversified investors, which implies that shareholder-value maximizing bank executives should willing to take more risk. It is also possible that by virtue of being publicly-traded, banks can raise capital more easily and at lower cost after a negative shock, which makes them more willing to take risk. Rather than attempting to rule out these explanations, we explore whether there is more direct evidence that supports the short-termism interpretation. We first show that the above-documented increase in risk increases short-term performance at the expense of long-term

performance, as would be predicted by the short-termism view. Then we show in the cross-section that banks with greater incentives to boost short-term performance take more risk.

4.1. Effect of Risk on Short-term and Long-term Performance

We start by examining the dynamics of bank performance. The short-termism hypothesis predicts that the increase in risk following public transition should increase return on equity (ROE) in the short run, but then lower ROE in the longer-run as risks later materialize. The first row in Panel A of Table 7 tracks the change in the quarterly return on equity (ROE) in the quarters after the transition relative to the quarter prior to the transition. These changes for the transitioning banks net out the changes in quarterly ROE of control banks that announced a transition that was later not completed. Note that the annual ROE is roughly four times the numbers reported in the table. Table 7 shows that by four quarters after the transition, quarterly ROE is 70 basis points higher than it was prior to the transition for the treated banks relative to the control banks, but by four years after the transition quarterly ROE is 130 basis points below the pre-transition level. Given a mean quarterly ROE of 2.9% and a cross-sectional standard deviation of 2.8%, these are sizable effects; the initial boost in performance is about one-quarter of a standard deviation and the decline in performance four years out is close to half of a standard deviation. A similar pattern exists for quarterly ROA (see Panel B of Appendix Table A.6)[16].

The second row of the panel tracks the quality and sustainability of earnings as determined by supervisors ("E" in the CAMELS rating). As noted in the Commercial Bank Examination Manual and described in more detail in the Appendix, the E rating is based on "not only the

[16] Appendix Table A.6 also reports the full path of the estimates in each quarter for ROE (Panel A) and ROA (Panel B).

quantity and trend of earnings, but also factors that may affect the sustainability or quality of earnings." Among other factors that supervisors evaluate are "the quality and sources of earnings, […] the adequacy of provisions to maintain the allowance for loan and lease losses and other valuation allowance accounts; the exposure of earnings to market risk such as interest-rate, foreign-exchange, and price risks." Despite the increase in ROE within a year of the transition, we do not see an improvement in the E rating; if anything, there is a deterioration in the E rating (as measured by an increase in the numerical E rating). This suggests that supervisors may associate the increase in E with an increase in risk. By two years post-transition, this deterioration in E is statistically significant, and after four years, as ROE falls, the E ratings deterioration is large and statistically significant.

Panel B of Table 7 presents additional findings suggesting that banks manage short-term earnings once they go public. Beatty et. al. (2002) and Cornett et. al. (2009) show that banks use loan loss provisions to manage earnings, at times understating expected loan losses to inflate earnings. Following the basic idea of the methodology in these papers, we calculate the so-called discretionary component of loan loss provisions as the residual of regression of loan loss provisions normalized by total assets on a variety of balance sheet variables that could affect this ratio including total assets, the share of loans that are non-performing, and loan type shares (real estate, C&I, consumer and other loans). We then show in the first column of Panel B that discretionary loan loss provisions fall after banks go public relative to the control banks that tried but failed. The reduction in loan loss provisions boost short-term earnings even if in the longer run banks would have to increase provisions as losses from risky activities are realized. Consistent with this finding, the second column of Panel B shows that loan loss provisions decrease relative to loan delinquencies in the period following IPO.

The third column of Table 7, Panel B examines another aspect of the short-termism hypothesis, namely that an increase in risk is associated with an increase in long-run earnings expectations. Here we measure long-run earnings forecasts as the IBES consensus equity analysts' forecasts. IBES defines this measure as the "expected annual increase in operating earnings over the company's next full business cycle," which IBES documentation indicates refers to a period between three to five years. In the sample of newly public banks, we regress this variable at time *t* on the composite CAMELS rating four quarters earlier. The coefficient is positive and statistically significant, indicating that banks that increase risk (in ways that may only be observable to supervisors), increase the earnings growth expectations of equity analysts and thus possibly the stock price. These earnings expectations are increased even though we have shown that an increase in risk following IPO is associated with longer-term declines in ROE. Finally, the fourth column of Table 7, Panel B shows that an increase in risk as measured by an increase in the composite CAMELS rating leads to earnings restatements 4 years later. This result is consistent with risk boosting short-term performance, which banks have to subsequently restate in the longer run as risks later materialize.

Overall, the results in Table 7 lend support for the view that banks increase risk after going public to boost short-term earnings. ROE is boosted after banks switch to a regime where they place greater weight on short-term performance and the long-run reversal of performance reflects the long-run adverse consequences of the risks that are hard to assess for investors in the short-run but eventually materialize in the long-run. While long-term underperformance could be simply an ex-post realization of bad luck, the deterioration of the supervisory earnings ratings despite the short-term boost in earnings is harder to square with increased risk capacity. And the reduction in discretionary loan loss provisioning despite the increase in risk further buttresses the interpretation

that transitions increase pressure to boost short-term performance. As such, the collection of this evidence provides some support for the view that the increase in risk may be motivated at least in part by boosting short-term performance.

4.2. Finer Cross-Sectional Evidence

Our final tests examine finer cross-sectional predictions. First, we test whether the increase in risk after going public is larger for public banks that place a higher weight on short-term performance. To that end, we add to the baseline DD specification (1) an interaction term of the treatment effect with empirical proxies for the extent to which banks' managers and shareholders are concerned with the short-term earnings performance and stock price. Based on the theory, we expect that banks that score *higher* on these measures should take *more* risk after they go public.[17] This analysis helps to further distinguish the short-termism interpretation from the alternatives because the latter do not make clear cut predictions about the investment horizon of insiders or investors.

Table 8 reports estimates from this triple-DD specification in the IPO sample using our main measure of risk, the composite CAMELS rating. Panel A shows results for empirical proxies of the extent to which shareholders and managers have short investment horizons. The first empirical proxy, CEO Short-Term Disclosure, measures the frequency with which the CEO uses short-term performance phrases on earnings calls and the Management Discussion and Analysis

[17] Note that we do not observe these variables for the banks that do not transition to public ownership so we set their values to zero. The term *After x X* cannot be estimated independently from *After x Treatment x X* because these proxies do not vary within private banks, and thus drops out of the estimation due to collinearity. (see Table legend for more details.)

section of the 10-K filings with the SEC uses these short-term performance phrases. Brochet, Lumiotti and Seraefim (2015) have shown that this measure based on earnings calls is related to short-term earnings management such as discretionary accruals. The results in column 1 of Table 8 Panel A indicate that the CAMELS rating deteriorates more after the public transition for banks with higher values of CEO Short-Term Disclosure.

As a second measure of short-term performance pressure we use a measure of institutional investor turnover based on Carhart (1997). Gaspar, Massa and Matos (2005) have shown that firms with more institutional investor turnover are more likely to receive a takeover bid. The risk of receiving a takeover bid figures prominently in theories of short-termism as managers are assumed to maximize short-term performance to avoid a takeover bid. The second column of Table 8 shows that CAMELS ratings deteriorate more after an IPO for banks with greater institutional investor turnover. The third and fourth columns of the table examine the effect of equity-based compensation on risk-taking. We consider two measures of equity-based compensation, which can be broadly interpreted as proxies for the weight the bank puts on short-term stock prices in the Stein (1989) model. In the model of Bolton, Scheinkman and Xiong (2006) equity compensation also leads to short-termism because managers are optimally compensated with equity to take advantage of the market's overvaluation of short-term performance. Banks with a greater percentage of equity-based compensation in the form of stock options increase risk more (column 3), but those with option grants that are longer in duration take relatively less risk (column 4).[18]

[18] Gopalan, Milbourn, Song, and Thakor (2014) and the subsequent literature construct similar measures of the duration of equity compensation and show evidence that they are negatively related to earning-increasing discretionary accruals. To validate that the measures capture independent cross-sectional variation, the in-sample correlation between the frequency of institutional investor shares turnover and the value (duration) of employee stock options is 0.19 (-0.20); that between the value and the duration of employee stock options is -0.03.

Finally, in Table 9 we examine whether the post-IPO increase in risk could be explained by an increase in a bank's risk-bearing capacity. In particular, risk-bearing capacity should increase if banks diversify by acquiring other banks or if insiders sell more of their shares in an IPO, reducing their undiversified stake and leading to more ownership by diversified investors. Column 1 of Table 9 shows that even banks that do not acquire other banks experience an increase in risk. Column 2 shows that when insiders sell only a small amount of their shares in a secondary offering, there is still an increase in bank risk-taking post-IPO.

In Table 9, we also explore whether our results are driven by banks that raise a lot of equity, whether in the IPO or in subsequent issuance, with the view that banks that raise more equity can bear more risk. In column 3 we show that banks that do not subsequently issue equity also experience and increase in risk post-IPO, as do those with low primary proceeds at the time of the IPO.

4.3. Implications

Our analysis highlights a novel rationale for bank risk-taking based on public ownership status. In Panel A of Table 10, we examine whether the results hold in the broader cross-section of U.S. banks. We report results of pooled (Columns 1 and 3) and fixed effects (Columns 2 and 4) regressions, with the composite CAMELS rating and the Bad CAMELS indicator as the dependent variables in the ten-year period (1997-2006) leading up to the financial crisis of 2007-2009. The coefficient on the explanatory variable, which is a dummy variable that equals one for banks that are held by a publicly-traded BHC, is positive and strongly statistically significant, in line with the increase in risk after a bank transitions to publicly-traded status that we have documented in our IPO sample. Earlier cross-sectional studies (Kwan, 2004 and Nichols, Whalnen and Wieland,

2009) do not find significant differences in risk across ownership status, especially after controlling for size. These studies may not find an effect because they use proxies for risk that are based on measures of ex-post operating performance, such as non-performing loans or volatility of operating performance in normal times. There is, however, little variation in these outcomes during normal times. By focusing on ex ante measures of risk and on changes in ownership status, one contribution of our study is that we are able to document a difference in risk in normal times.[19]

In Panel B of Table 10, we examine the financial crisis performance of banks that previously went public in an IPO. We conduct a DD analysis with a measure of bank performance, ROE, as the dependent variable. We add to our baseline specification an interaction of the crisis dummy with the treatment effect (i.e., *Treatment x After x Crisis*), which allows us to test whether there was greater underperformance of the treated banks relative to control banks during the crisis.[20] The results are reported in column 1 for the full sample. The estimates indicate that newly listed banks significantly underperformed during the crisis, a result that is stronger when we restrict to sample to sub-samples of IPOs that are more likely to be plagued by short-termism based on the cross-section proxies for institutional ownership turnover (column 2) and equity-based compensation (column 3) and its duration (column 4). Given a mean quarterly ROE of 2.9% and a cross-sectional standard deviation of 2.8%, the estimates are sizable. The result holds along a

[19] Other papers have shown that banks increase risk when they convert from a mutual form of organization to stock ownership (Esty, 1997; Schrand and Unal, 1998). These papers interpret the finding as evidence that shareholders have incentives to increase risk when they get all of the benefits on the upside but bear only a part of the losses on the downside. Since the conversion is often also associated with an initial public offering of stock, it is possible that the stock market pressure hypothesis we have advanced here might also be part of the explanation.

[20] Note that we are excluding *Crisis* and the interactions *Treatment x Crisis* and *After x Crisis. Crisis* is excluded because it is collinear with the time dummies. *After x Crisis* is excluded because it is collinear with *Crisis* given that After is always one when *Crisis* is one (as we are excluding the small number of transitions that occur during the crisis to alleviate concerns about mechanical correlation between transitions and performance in the crisis). This implies that *Treatment x Crisis* is also collinear with *Treatment x After x Crisis*.

broader set of other measures of bank operating performance (see Appendix Table A.7). There is no evidence that banks that transition to public share ownership underperform in normal times, consistent with our premise that the cost of risk is hard to detect in the short-term using ex-post performance.

As highlighted by these implications, an important takeaway of our study is that some of the defining organizational features of the modern banking corporation, such as, for example, the relatively short-term focus of its investor base and the reliance on compensation schemes that load on short-term stock prices, create incentives to take risk and may impair bank resilience in a financial crisis.

5. Conclusion

In this paper, we argue and present evidence that access to public equity markets induces banks to increase risk. Our findings raise a number of additional questions.

First, what effect does the increase in risk-taking incentives of publicly-traded banks have on the behavior of privately-held banks? If these incentives essentially increase the supply of credit by publicly-traded banks, they make privately-held banks less profitable and may induce them to take more risk as well. Alternatively, these private banks – which may be more focused on long-run value – could reduce their supply of credit in response, acting as something of a stabilizing force.

Second, do these sorts of risk-taking incentives exist in other non-bank financial intermediaries? Kacperczyk and Schnabl (2013) and Chernenko and Sunderam (2014) present evidence that suggests that they do. These papers show that assets under management in institutional money market funds are much more sensitive to yield than are retail money market

funds, which in turn creates strong financial incentives for institutional money market funds to increase risk, much as stock-market pressure creates incentives for banks to increase risk. It would therefore not be surprising if institutional bond funds engaged in similar behavior, or if open-ended bond funds took more risk than closed-end funds (which do not see greater fund flows when yield increases). Similar incentives might also exist in insurance. While reaching for yield has been shown to exist in insurance (Becker and Ivashina, 2015), our results raise the question of whether it is more pronounced among publicly-traded insurance companies as compared to mutual organizations.

Finally, what are the implications of bank risk-taking behavior for regulation? Our findings provide some support for the view that compensation schemes should require management to hold stock for longer periods to mitigate their incentives to pump up short-term earnings and the short-term stock price. Of course, the wisdom of such a policy depends on whether one believes that the risk-taking behavior documented here is socially excessive. Our findings also point to a tension in regulatory policy. While bank regulators may want to limit the extent to which banks respond to stock market pressure, securities regulators try to promote good corporate governance, which tends to increase the power of shareholders to impact firm behavior. As we have shown, good governance – and the stock market pressure associated with it – may actually lead to an undesirable increase in risk.

References

Beatty A.L., Ke B., Petroni K.R., 2002, “Earnings Management to Avoid Earnings Declines Across Publicly and Privately Held Banks,” The Accounting Review, 77, 547-570.

Bebchuk, Lucian, Alma Cohen and Holger Spamann, 2010, "The Wages of Failure: Executive Compensation at Bear Stearns and Lehman 2000-2008," Yale Journal on Regulation 27, 257-282.

Becker, B and Ivashina V., 2015, “Reaching for Yield in the Bond Market,” Journal of Finance, 70(50, 1863-1902.

Berger, Allen N., Anil K. Kashyap, and Joseph M. Scalise, 1995, "The Transformation of the U.S. Banking Industry: What a Long, Strange Trip It's Been," Brookings Papers on Economic Activity, No. 2, pp. 55-201.

Bernstein, Shai, 2015, "Does Going Public Affect Innovation?" Journal of Finance, 70(4), 1365-1403.

Bliss, Richard T., and Richard, Rosen, 2001, “CEO Compensation and Bank Mergers,” Journal of Financial Economics, 61(1), 107-138.

Bloom, Nicholas, Raffaella Sadun, and John Van Reenen, 2012, "Americans do I.T. Better: US Multinationals and the Productivity Miracle," American Economic Review, 102(1): 167-201.

Bolton, Patrick and Mehran, Hamid and Shapiro, Joel D., 2015, "Executive Compensation and Risk Taking," Review of Finance, 19(6), 2139-2181.

Bolton, P., J. Scheinkman, and W. Xiong, 2006, “Executive Compensation and Short-Termist Behavior in Speculative Markets,” Review of Economic Studies, 73, 577–610.

Brochet, Francois, Maria Loumioti, and George Serafeim, 2015, “Speaking of the Short-Term: Disclosure Horizon and Managerial Myopia,” Review of Accounting Studies, 20, 1122-1163.

Bushee, Brian J., 1998, “The Influence of Institutional Investors on Myopic R&D Behavior,” Accounting Review, 73(3), 305-333.

Bushee, Brian J., 2001, “Do Institutional Investors Prefer Near-Term Earnings over Long-Run Value?” Contemporary Accounting Research, 18, 207-246.

Chernenko, S. and A. Sunderam, 2014, “Frictions in Shadow Banking: Evidence from the Lending Behavior of Money Market Funds,” Review of Financial Studies, 27(6), 1717-1750.

Cornett, M.M., J.J. McNutt, and H. Tehranian, 2009, “Corporate Governance and Earnings Management at Large U.S. Bank Holding Companies,” Journal of Corporate Finance, 15(4), 412-430.

DellAriccia, Laeven, and Suarez, 2017, “Bank Leverage and Monetary Policy's Risk-Taking Channel: Evidence from the United States,” Journal of Finance, 72 (2), 613-654.

Erel, Isil, 2011, “The Effect of Bank Mergers on Loan Prices: Evidence from the United States,” Review of Financial Studies, 24(4), 1068–1101.

Esty, Benjamin 1997, “Organizational Form and Risk-Taking in the Savings and Loan Industry,” Journal of Financial Economics 44, 25-55.

Farhi Emmanuel and Jean Tirole, 2012, "Collective Moral Hazard, Maturity Mismatch, and Systemic Bailouts," American Economic Review, 102(1):60--93, 2012.

Gaspar, Jose-Miguel, Massimo Massa and Pedro Matos, 2005, “Shareholder Investment Horizon and the Market for Corporate Control,” Journal of Financial Economics, 76, 135-165.

Gennaioli, Nicola, Andrei Shleifer, and Robert Vishny, 2012, "Neglected risks, Financial Innovation, and Financial Fragility," Journal of Financial Economics 104, 452-468.

Gopalan, Radhakrishnan, Todd Milbourn, Fenghua Song, and Anjan V. Thakor, 2014, “Duration of Executive Compensation,” Journal of Finance, 59(6), 2777-2817.

Heckman, J. J., H. Ichimura and P. E. Todd, 1997, "Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme," The Review of Economic Studies, 64, 605-654.

Jordà, Ò., M. Schularick, and A. M. Taylor, 2013, "When Credit Bites Back: Leverage, Business Cycles, and Crises," Journal of Money, Credit, and Banking, Vol 45(2), p. 3--28.

Kane, Edward J., 1985, The Gathering Crisis in Federal Deposit Insurance, Cambridge, Mass.: MIT Press.

Kacperczyk, M. and P. Schnabl, 2013, “Are Money Market Funds Safe?” Quarterly Journal of Economics, 128(3), 1073-1122.

Kwan, Simon H., 2004, "Risk and Return of Publicly Held versus Privately Owned Banks," FRBNY Economic Policy Review, September, pp. 97-107.

La Porta, Rafael, 1996, “Expectations and the Cross-Section of Expected Returns,” Journal of Finance, 51, 1715-1742.

Nichols, D.C., J.M. Wahlen, and M.M. Wieland, 2009, "Publicly-Traded vs. Privately-Held: Implications for Bank Profitability, Growth Risk, and Accounting Conservatism," Review of Accounting Studies, 14, 88-122.

Pennacchi, George G., 1987. "Alternative Forms of Deposit Insurance: Pricing and Bank Incentive Issues," Journal of Banking and Finance, vol. 11(2), pp. 291-312.

Schrand, Catherine and Haluk Unal 1998, “Hedging and Coordinated Risk Management,” Journal of Finance 53, 979-1013.

Seru, Amit, 2014, "Firm Boundaries Matter: Evidence from Conglomerates and R&D Activity," Journal of Financial Economics 111, 381--405.

Stein, Jeremy C., 1989, "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior", Quarterly Journal of Economics 104:655-669.

Appendix: Variable Definitions

The variables used in this paper are extracted from four main data sources: the National Information Center (NIC) of the Federal Reserve System, the Federal Reserve's Survey of Terms of Business Lending (STBL), Call Reports, and lists of announced (completed and withdrawn) IPOs and M&As from SDC, Capital IQ, and SNL Financial. For each data item, we indicate the relevant source in square brackets. The variables are defined as follows:

Bank Risk – Outcome Measures Based on Supervisory Data [NIC/STBL]:

- *Capital Adequacy* rating: "A financial institution is expected to maintain capital commensurate with its risks and the ability of management to identify, measure, monitor, and control these risks. The capital adequacy of an institution is rated based on, but not limited to, an assessment of the following evaluation factors: the level and quality of capital and the overall financial condition of the institution; the ability of management to address emerging needs for additional capital; balance-sheet composition, including the nature and amount of intangible assets, market risk, concentration risk, and risks associated with nontraditional activities; risk exposure represented by off-balance-sheet activities" (source: Commercial Bank Examination Manual).

- *Asset Quality* rating: "The asset-quality rating reflects the quantity of existing and potential credit risk associated with the loan and investment portfolios, other real estate owned, other assets, and off-balance-sheet transactions. The ability of management to identify, measure, monitor, and control credit risk is also reflected here. The asset quality of a financial institution is rated based on, but not limited to, an assessment of the following evaluation factors: the adequacy of underwriting standards, soundness of credit-administration practices, and appropriateness of risk-identification practices; the level, distribution, severity, and trend of problem, classified, nonaccrual, restructured, delinquent, and nonperforming assets for both on- and off-balance-sheet transactions; the adequacy of the allowance for loan and lease losses and other asset valuation reserves; the credit risk arising from or reduced by off-balance-sheet transactions, such as unfunded commitments, credit derivatives, commercial and standby letters of credit, and lines of credit; the diversification and quality of the loan and investment portfolios; the extent of securities underwriting activities and exposure to counterparties in trading activities; the existence of asset concentrations; the adequacy of loan and investment policies, procedures, and practices; the ability of management to properly administer its assets, including the timely identification and collection of problem assets; the adequacy of internal controls and management information systems; the volume and nature of credit-documentation exceptions" (source: Commercial Bank Examination Manual).

- *Management* rating: "The capability of the board of directors and management, in their respective roles, to identify, measure, monitor, and control the risks of an institution's activities, and to ensure a financial institution's safe, sound, and efficient operation in compliance with applicable laws and regulations is reflected in this rating. The capability and performance of management and the board of directors is rated based on, but not limited to, an assessment of the following evaluation factors: the level and quality of oversight and support of all institution activities by the board of directors and management; the ability of the board of directors and management, in their respective roles, to plan for and respond to risks that may arise from changing business conditions or the initiation of new activities or products; the adequacy of and conformance with appropriate internal policies and controls addressing the operations and risks of significant activities; compliance with laws and regulations; responsiveness to recommendations from auditors and supervisory authorities; management depth and succession; the extent that the board of directors and management are affected by or susceptible to dominant

influence or concentration of authority; reasonableness of compensation policies and avoidance of self-dealing" (source: Commercial Bank Examination Manual).

- *Earnings* rating: "The earnings rating reflects not only the quantity and trend of earnings, but also factors that may affect the sustainability or quality of earnings. High levels of market risk may unduly expose the institution's earnings to volatility in interest rates. The rating of an institution's earnings is based on, but not limited to, an assessment of the following evaluation factors: the level of earnings, including trends and stability; the ability to provide for adequate capital through retained earnings; the quality and sources of earnings; the level of expenses in relation to operations; the adequacy of the budgeting systems, forecasting processes, and management information systems in general; the adequacy of provisions to maintain the allowance for loan and lease losses and other valuation allowance accounts; the exposure of earnings to market risk such as interest-rate, foreign-exchange, and price risks" (source: Commercial Bank Examination Manual).

- *Liquidity* rating: "In evaluating the adequacy of a financial institution's liquidity position, consideration should be given to the current level and prospective sources of liquidity compared to funding needs. Liquidity is rated based on, but not limited to, an assessment of the following evaluation factors: the adequacy of liquidity sources compared with present and future needs and the ability of the institution to meet liquidity needs without adversely affecting its operations or condition; the availability of assets readily convertible to cash without undue loss; access to money markets and other sources of funding; the level of diversification of funding sources, both on- and off-balance-sheet; the degree of reliance on short-term, volatile sources of funds, including borrowings and brokered deposits, to fund longer-term assets; the trend and stability of deposits; the ability to securitize and sell certain pools of assets; the capability of management to properly identify, measure, monitor, and control the institution's liquidity position, including the effectiveness of funds-management strategies, liquidity policies, management information systems, and contingency funding plans" (source: Commercial Bank Examination Manual).

- *Sensitivity to Market Risk* rating: "The sensitivity to market risk component reflects the degree to which changes in interest rates, foreign-exchange rates, commodity prices, or equity prices can adversely affect a financial institution's earnings or economic capital. Market risk is rated based on, but not limited to, an assessment of the following evaluation factors: the sensitivity of the financial institution's earnings or the economic value of its capital to adverse changes in interest rates, foreign-exchange rates, commodity prices, or equity prices; the ability of management to identify, measure, monitor, and control exposure to market risk given the institution's size, complexity, and risk profile; the nature and complexity of interest-rate risk exposure arising from nontrading positions; where appropriate, the nature and complexity of market-risk exposure arising from trading and foreign operations" (source: Commercial Bank Examination Manual).

- *CAMELS* ("composite") rating: "The composite rating generally bears a close relationship to the component ratings assigned. However, the composite rating is not derived by computing an arithmetic average of the component ratings. When assigning a composite rating, some components may be given more weight than others depending on the situation at the institution. The ability of management to respond to changing circumstances and address the risks that may arise from changing business conditions or the initiation of new activities or products is an important factor in evaluating a financial institution's overall risk profile, as well as the level of supervisory attention warranted" (source: Commercial Bank Examination Manual).

- *Weak Composite CAMELS* rating*:* An indicator that equals one if the bank is rated as weak (a rating of 3 and above) along the "composite" CAMELS rating in any given quarter.

- *Weak Component CAMELS* rating*:* An indicator that equals one if the bank is rated as weak (a rating of 3 and above) along any of the eight supervisory ratings ("component" CAMELS, "composite" CAMELS, and STBL loan risk rating) in any given quarter.
- *STBL Loan Risk* rating: a loan-level rating of risk whose values range from the least risky loans that are rated a 1 to the most risky loans that are rated a 5. [STBL]

Bank Risk – Outcome Measures Based on Regulatory Filings [Call Reports]:

- *Risk Weighted Assets (RWA) to Total Assets*: Risk-weighted assets (RCFD8274) divided by total assets (RCFD2170).
- *RRE Loans to Total Loans*: Loans secured by 1-4 family residential properties (RCON1797 + RCON5367 + RCON5368) divided by Total loans and lease financing receivables (RCFD5369)
- *Tier 1 Capital Ratio:* Tier 1 capital (RCFD8274) minus the adjustment to tier 1 capital (RCFDC228) for financial subsidiaries, divided by risk-weighted assets (RCFDA223) minus the adjustment to risk-weighted assets for financial subsidiaries (RCFDB504).
- *Volatile Liabilities Dependence Ratio*: The sum of interest-bearing foreign liabilities (RCFN6636), large time deposits (RCON2604), federal funds borrowed and repos (RCONB993 + RCFDB995), demand notes issued to the U.S. Treasury and other borrowed money (RCFD3190) minus federal funds lent and reverse repos (RCONB987 + RCFDB989) and assets held in the trading account (RCFD3545 – RCON3543 – RCFN3543), all divided by total assets (RCFD2170).
- *Hot Money* (also referred to as Short-term Money): The sum of large time deposits with a remaining maturity of less than one year (RCONA242), federal funds purchased and securities sold under agreements to resell (RCONB993 + RCFDB995), interest-bearing deposits in foreign offices, trading liabilities net of revaluation losses (RCFD3548-RCFD3547), accounts payable (RCFD3066), dividends declared but not yet payable (RCFD2932), and advances with a remaining maturity of one year or less (RCFDB571), all divided by total assets (RCFD2170).
- *Maturity Mismatch*: Approximate weighted-average time to maturity or repricing date of interest bearing assets less the approximate weighted-average time to maturity or re-pricing date of liabilities. Maturities are reported in ranges that go from up to three months, over three months through 12 months, over a year through three years, and so on. The midpoint of each of these ranges is assumed to be the maturity – i.e., for example, the maturity of the 1 year to 3 years range is assumed to be 2 years. Interest-earning assets are comprised of securities (Schedule RC-B, Memoranda Item 2) and loans and leases (Schedule RC-C Part I, Memoranda Item 2). Liabilities are comprised of deposits (Schedule RC-E Part I, Memoranda Items 2, 3, 4) and other borrowed money (Schedule RC-M, Memoranda Item 5).
- *Non-Deposit Fee Income*: Noninterest income net of deposit fees (RIAD4079- RIAD4080) and fiduciary income (RIAD4070) divided by total assets (RCFD2170).

Bank Performance & Outcome Measures:

- *ROE*: The ratio of Income (loss) before income taxes, extraordinary items, and other adjustments (RIAD4301) minus taxes on ordinary income (RIAD4302), divided by total bank equity capital (RCFD3210).
- *ROA*: The ratio of Income (loss) before income taxes, extraordinary items, and other adjustments (RIAD4301) minus taxes on ordinary income (RIAD4302), divided by total assets (RCFD2170).

- *Net Interest Margin*: The ratio of Annualized net interest income (RIAD4074) divided by (30-day average) interest-earning assets (RCFD3381+ RCFDB558 + RCFDB559 + RCFDB560 + RCFD3365 + RCFD3360 + RCFD3484 + RCFD3401).

- *Non Performing Loans to Total Assets*: The sum of all loans that are past due 90 days or more and still accruing (Schedule RC-N, Items 1 – 9 Column B) divided by total assets (RCFD2170).

- *Discretionary Loan Loss Provisions (LLP) to Loans*: The ratio of the discretionary part of Provision for loan and lease losses (RIAD4230) divided by total loans (RCFD2112). The discretionary part is measured following the approach of Cornett et al (2009) and Beatty et al. (2002), which is similar to that used in the accounting literature to estimate discretionary accruals for non-financial firms. The ratio of loan loss provisions to total loans is regressed on several bank-level variables, that include total assets as well as non-performing loans to total loans, real estate loans to total loans, C&I loans to total loans, consumer loans to total loans, and other loans to total loans. The coefficient estimates from this regression are then used to compute the normal loan loss provisions for each bank as the predicted values from the regression. The difference between the actual loan loss provisions and the normal loan loss provisions are discretionary loan loss provisions.

- *Loan Loss Provisions to Total Assets*: The ratio of Provision for loan and lease losses (RIAD4230) divided by total assets (RCFD2170).

- *Loan Loss Provisions to Delinquencies*: The ratio of Provision for loan and lease losses (RIAD4230) divided by Delinquencies on all loans and leases (RC-N).

- *(In-)Efficiency Ratio*: The ratio of Noninterest expense (RIAD4093) divided by revenue. Revenue is the sum of net interest income (RIAD4074) and noninterest income (RIAD4079)).

- *Overhead Costs Ratio*: The ratio of Noninterest expense (RIAD4093) divided by revenue. Revenue is the sum of net interest income (RIAD4074) and noninterest income (RIAD4079)).

- *Delinquencies/Loan Loss Reserves*: The ratio of Delinquencies on all loans and leases (RC-N) divided by reserves for loan losses (RCFD3123).

- *Noncurrent Loan Ratio*: The sum of loans that are more than 30-day past due and still accruing (Schedule RC-N Column A) and those that are not accruing (Schedule RC-N Column C) divided by total loans (RCFD2112).

- *IBES* Δ EPS^{LT}*:* The consensus equity analysts' long-term growth forecast in a given quarter, where the typical forecast represents the "expected annual increase in operating earnings over the company's next full business cycle." Typically, the IBES documentation indicates that these forecasts refer to a period between three to five years. [IBES]

- *Restatements:* A dummy variable that equals one if the originally announced earnings are higher than the restated earnings in a given quarter.[Compustat Unrestated]

<u>*Bank Characteristics:*</u>

- *Total Assets*: The natural logarithm of total assets (RCFD2170).

- *Relative Size*: For the acquisition sample, the difference between the acquiring bank size and the target bank size, both measured as the natural logarithm of the respective total assets (RCFD2170).

- *Loans to Assets*: Total loans and lease financing receivables (RCFD5369) divided by total assets (RCFD2170).

- *Deposit to Assets*: The sum of Non-interest deposits (RCON6631+RCFN6631) and interests deposits (RCON6636+RCFN6636), all divided by total assets (RCFD2170).

- *Securities to Loans*: Securities excluding the trading account (RCFD8641) divided by total loans and lease financing receivables (RCFD5369).

- *Tier 1 Capital Ratio*: The sum of tier 1 capital (RCFD8274) and the adjustment to risk-weighted assets for financial subsidiaries (RCFDB504), divided by risk-weighted assets (RCFDA223) minus the adjustment to risk-weighted assets for financial subsidiaries (RCFDB504).

- *Institutional Investor Turnover*: The cumulative density (cdf) of the average (using portfolio shares $w_{k,i,t}$) of institutional investors' portfolio turnover based on Cahart (1997). Specifically, if we denote the set of companies held by investor i by Q; the turnover rate of investor i at quarter t is defined as $TR_{i,t} = \frac{\sum_{j \in Q} \left| N_{j,i,t} P_{j,t} - N_{j,i,t-1} P_{j,t-1} - N_{j,i,t-1} \Delta P_{j,t} \right|}{\frac{1}{2} \sum_{j \in Q} N_{j,i,t} P_{j,t} + N_{j,i,t-1} P_{j,t-1}}$,where $P_{j,t}$ and $N_{j,i,t}$ represent the price and the number of shares, respectively, of company j held by institutional investor i at quarter t. [Thomson-Reuters Institutional Holdings (13F) database]

- *Transient Institutional Investors:* The cumulative density (cdf) of the percentage of total equity shares outstanding that is owned by "transient" institutions based on Bushee (1998) in any given quarter. [Thomson-Reuters Institutional Holdings (13F) database and Brian Bushee's Institutional Investor Classification Data at https://accounting-faculty.wharton.upenn.edu/bushee/]

- *CEO Trading*: The cumulative density (cdf) of the number of CEO sales of shares minus the number of CEO purchases of shares divided by the total number of CEO trades within a given quarter. Only cleansed, non-derivative transactions are included. [Thomson Reuters Insider Filings (Forms 3, 4, 5, and 144) Database].

- CEO *Short-Term Disclosure:* The cumulative density (cdf) of an index that is based on textual analysis and is higher whenever the text of a bank's quarterly earnings conference call transcripts or the MD&A section of the bank's annual reports to the SEC contains a relatively larger (smaller) proportion of short-term (long-term) related words. The list of words referring to time horizon is based on Brochet, Loumioti, and Serafeim (2015, Appendix A), and is as follows: Short-term horizon words = [day(-s or daily), short-run (or short run), short-term (or short term), week(-s or -ly), month(-s or -ly), quarter(-s or -ly)]; Long-term horizon words = [long-term (or long term), long-run (or long run), year(-s or annual(-ly)), look(ing) ahead, outlook].

- *% CEO Stock Unvested:* The cumulative density (cdf) of the fraction of CEO stock grants thas has not yet vested. [ExecuComp, Capital IQ]

- *% CEO Options Unvested:* The cumulative density (cdf) of the fraction of CEO stock option grants thas has not yet vested. [ExecuComp, Capital IQ]

- *% Employee Stock Options B-S Value:* The cumulative density (cdf) of the Black-Scholes value of employee stock option grants divided by total payroll (BHCK4135) [Riskmetrics, Capital IQ]

- *Employee Stock Options Duration:* The cumulative density (cdf) of the (value-weighted) average duration of employee stock option grants. [Riskmetrics, Capital IQ]

Table 1: Summary Statistics

This table presents summary statistics (means) for the main samples used in the analysis. Column (1) refers to the starting merged BHC-Commercial Bank Sample, which consists of 178,980 commercial bank-quarter observations for the universe of commercial banks held by a BHC between 1990 and 2012. Column (2) refers to the baseline identification sub-sample, the Announced IPOs Sample, which is defined as those commercial banks in our merged BHC-Commercial Bank Sample that over the sample period announce and either complete ("treatment" group) or withdraw ("control" group) a switch from being held by a privately-held BHC to a publicly-traded BHC. The announced switches are due to an IPO, which leads to a sample of 17,754 commercial bank-quarter observations involving 276 unique BHCs and 528 unique commercial banks between 1990 and 2012. Column (3) refers to the robustness sub-sample, the Completed M&As Sample, which is defined as those commercial banks in our merged BHC-Commercial Bank Sample that over the sample period become targets of a completed M&A deal, which either leads to an ownership switch because of an acquisition of a privately-held target by a publicly-traded acquirer ("treatment" group) or does not lead to an ownership switch because of an acquisition between two publicly-traded or two privately-held BHCs ("control" group), leading to 21,757 commercial bank-quarter observations involving 1,089 BHCs and 1,631 commercial banks between 1990 and 2012. Definitions for all variables are in Appendix.

	BHC-Commercial Bank Sample	Announced IPOs Sample	Completed M&As Sample
	Mean	Mean	Mean
	[1]	[2]	[3]
Public Listing Status:			
Public BHC (dummy)	0.40	0.69	0.55
Supervisory Ratings:			
Composite CAMELS (% Weak)	1.73 (0.08)	1.87 (0.09)	1.88 (0.09)
Capital Adequacy (% Weak)	1.65 (0.06)	1.77 (0.07)	1.74 (0.07)
Asset Quality (% Weak)	1.70 (0.13)	1.81 (0.14)	1.85 (0.14)
Management Quality (% Weak)	1.78 (0.10)	1.97 (0.11)	1.94 (0.11)
Earnings (% Weak)	1.85 (0.16)	1.97 (0.17)	1.93 (0.16)
Liquidity (% Weak)	1.63 (0.06)	1.77 (0.07)	1.79 (0.07)
Risk-sensitivity (% Weak)	1.66 (0.05)	1.86 (0.06)	1.79 (0.64)
STBL Loan Risk (% Weak)	3.15 (0.15)	3.38 (0.17)	3.37 (0.17)
Bank Characteristics:			
Total Assets, log ($1,000s)	12.14	11.88	12.07
Loans to Assets	0.61	0.60	0.59
Deposit to Assets	0.70	0.73	0.74
Securities to Loans	0.49	0.46	0.52
Tier 1 Capital	0.09	0.09	0.09
Bank-Quarter Observations	178,980	17,754	21,757
BHCs	3,251	276	1,089
Commercial Banks	7,166	528	1,631

Table 2: Difference-in-Differences Analysis, Diagnostic Tests

This table reports tests of the validity of the control group construction for the difference-in-differences analysis. We report summary statistics of pre-treatment CAMELS ratings, their trends, as well as balance sheet characteristics for banks in the treatment (Column 1) and control (Column 2) groups, respectively. Column 3 reports t-tests of the null hypothesis that treated and control banks are similar along each characteristic, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively. Panel A is for the baseline identification sub-sample, the Announced IPOs Sample, which is defined as those commercial banks in our merged BHC-Commercial Bank Sample that over the sample period announce and either complete ("treatment" group) or withdraw ("control" group) a switch from being held by a privately-held BHC to a publicly-traded BHC. The announced switches are due to an IPO, which leads to a sample of 17,754 commercial bank-quarter observations involving 276 unique BHCs and 528 unique commercial banks between 1990 and 2012. Panel B is for the robustness sub-sample, the Completed M&As Sample, which is defined as those commercial banks in our merged BHC-Commercial Bank Sample that over the sample period become targets of a completed M&A deal, which either leads to an ownership switch because of an acquisition of a privately-held target by a publicly-traded acquirer ("treatment" group) or does not lead to an ownership switch because of an acquisition between two publicly-traded or two privately-held BHCs ("control" group), leading to 21,757 commercial bank-quarter observations involving 1,089 BHCs and 1,631 commercial banks between 1990 and 2012.

Panel A: Pre-Announcement Bank Characteristics for the Announced IPO Sample			
	Treatment (Successful) [1]	Control (Withdrawn) [2]	Difference (t-stat) [3]
Total Assets$_{t-1}$, log ($1,000s)	11.987	11.425	0.562***
			(5.073)
Loans to Assets$_{t-1}$	0.602	0.605	-0.003
			(-0.355)
Deposits to Assets$_{t-1}$	0.732	0.740	-0.008
			(-0.712)
Securities to Loans$_{t-1}$	0.467	0.434	0.032
			(0.706)
Tier 1 Capital$_{t-1}$	0.087	0.089	-0.002
			(-0.676)
CAMELS rating$_{t-1}$	1.875	1.835	0.040
			(0.474)
Weak CAMELS rating $_{t-1}$	0.081	0.079	0.002
			(0.331)
Δ CAMELS rating$_{t-1}$	0.006	-0.009	0.015
			(0.338)
Δ CAMELS rating$_{t-4}$	0.007	-0.017	0.024
			(0.498)
Number of Obs.	406	122	528
Panel B: Pre-Event Bank Characteristics for the Completed M&A Sample			
	Treatment (Switching) [1]	Control (Non-Switching) [2]	Difference (t-stat) [3]
Total Assets$_{t-1}$, log ($1,000s)	11.931	12.122	-0.192***
			(-3.097)
Loans to Assets$_{t-1}$	0.589	0.590	-0.001
			(-0.134)
Deposits to Assets$_{t-1}$	0.748	0.744	0.004
			(0.451)
Securities to Loans$_{t-1}$	0.521	0.520	0.001
			(-0.100)
Tier 1 Capital$_{t-1}$	0.084	0.085	0.000
			(0.138)
CAMELS rating$_{t-1}$	1.889	1.856	0.032
			(0.802)
Weak CAMELS rating$_{t-1}$	0.081	0.087	-0.006
			(0.611)
Δ CAMELS rating$_{t-1}$	-0.004	-0.002	-0.002
			(0.309)
Δ CAMELS rating$_{t-4}$	-0.012	-0.009	-0.003
			(-0.414)
Number of Obs.	676	955	1,631

Table 3: Difference-in-Differences Analysis, Baseline Tests

This table reports the main results of the difference-in-differences analysis of the overall supervisory rating, the composite CAMELS. In Panel A, the DD specification is $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, and $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group. The period considered is the run-up to the crisis. Columns 1 and 2 of Panel A report baseline DD estimates for the Announced IPOs Sample. Columns 3 and 4 of Panel A report robustness DD estimates for the Completed M&As Sample. Panel B reports results of additional robustness analysis for the Announced IPOs Sample. Columns 1 and 2 of Panel B report results of instrumental variable (2SLS) analysis. The IV-2SLS specification is $RISK_i^{Post} = \beta_1 \widehat{Completed\ Deal}_i + \gamma_1 RISK_i^{Pre} + \gamma_2 Z_i + \mu_t + \varepsilon_i$, where $RISK_i^{Post}$ is the average risk-taking proxy in the quarters after the announcement date, $RISK_i^{Pre}$ is the corresponding average in the quarters prior to the announcement, and $\widehat{Completed\ Deal}_i$ is an indicator variable for those commercial banks that complete their switch from private to public as predicted from the following (first-stage) regression: $Completed\ Deal_i = \beta_2 S\&PBank_i + \gamma_3 Z_i + \mu_t + \varepsilon_i$, in which we use S&P Bank Index returns in the two months following each announcement as the instrument. Columns 3 and 4 of Panel B report results of matched-sample DD analysis. The specification that is estimated is $CAMELS_{it} - \overline{CAMELS}_{-it} = \beta After_{it} + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise. To implement the estimator, we use a methodology analogous to long-run event studies (e.g., Barber and Lyons (1997)) and for each bank-quarter in the treatment group construct a "benchmark" CAMELS, $\overline{CAMELS}_{-it}$, for a matched portfolio of banks in the control group. The procedure used to choose a match is propensity score matching and the covariates used for matching are year and commercial bank pre-transition average rating and average total assets. All specifications include a control for the natural logarithm of total assets. For the acquisition sample, we also include a control for the difference between the natural logarith of the acquiring bank and the target bank total assets. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Main Analysis of Supervisory Ratings				
	Announced IPOs Sample		Completed M&As Sample	
	Composite CAMELS Rating [1]	Weak Composite CAMELS Rating [2]	Composite CAMELS Rating [3]	Weak Composite CAMELS Rating [4]
After*Treatment	0.316***	0.088***	0.098***	0.056***
	(0.114)	(0.024)	(0.021)	(0.014)
After	-0.148	-0.016	-0.036	0.000
	(0.252)	(0.035)	(0.054)	(0.017)
Total Assets	0.007	0.020	-0.019	0.028
	(0.045)	(0.019)	(0.020)	(0.032)
Relative Size			0.084	-0.016***
			(0.292)	(0.004)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	10,312	10,312
Adj-R^2	0.492	0.296	0.664	0.594
Panel B: Robustness Analysis of Supervisory Ratings, Announced IPOs Sample				
	2SLS-IV		Matching on Time, Rating, and Size	
Completed Deal	0.343**	0.104***		
	(0.145)	(0.033)		
After			0.247***	0.084***
			(0.064)	(0.026)
Total Assets	-0.101	0.013	-0.012	-0.022
	(0.099)	(0.029)	(0.019)	(0.017)
Bank FE	No	No	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	No	No	Yes	Yes
Filing Year FE	Yes	Yes	No	No
Number of Obs.	351	351	6,728	6,728

Table 4: Difference-in-Differences Analysis of Sub-Component Supervisory Ratings

This table reports results of the difference-in-differences analysis of sub-component supervisory ratings for asset and loan risk (Panel A) and financing risk (Panel B). The DD specification that is estimated is $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, and $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group. The period considered is the run-up to the crisis. Columns 1 and 2 report baseline DD estimates for the Announced IPOs Sample. Columns 3 and 4 report robustness DD estimates for the Completed M&As Sample. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Analysis of Asset and Loan Risk Supervisory Ratings				
	Announced IPOs Sample		Completed M&As Sample	
	A Rating	STBL Rating	A Rating	STBL Rating
	[1]	[2]	[3]	[4]
After*Treatment	0.316**	0.403***	0.154***	0.103***
	(0.167)	(0.125)	(0.038)	(0.030)
After	-0.089	-0.151	-0.028	0.069
	(0.501)	(0.199)	(0.031)	(0.077)
Total Assets	0.022	-0.170	0.003	0.005
	(0.045)	(0.202)	(0.009)	(0.046)
Relative Size			0.063	0.027
			(0.098)	(0.062)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	8,237	18,790	10,312	28,281
Adj-R^2	0.401	0.449	0.593	0.239
Panel B: Analysis of Financing Risk Supervisory Ratings				
	Announced IPOs Sample		Completed M&As Sample	
	C, L Ratings	Risk Rating	C, L Ratings	Risk Rating
	[1]	[2]	[3]	[4]
After*Treatment	0.254**	0.308***	0.083***	0.129***
	(0.115)	(0.111)	(0.032)	(0.034)
After	-0.173	-0.135	-0.082	0.024
	(0.115)	(0.105)	(0.087)	(0.028)
Total Assets	0.003	0.051	-0.015**	0.008
	(0.031)	(0.057)	(0.008)	(0.008)
Relative Size			0.017	-0.029
			(0.083)	(0.087)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	10,312	10,312
Adj-R^2	0.560	0.426	0.623	0.629

Table 5: Difference-in-Differences Analysis of Balance Sheet Measures of Risk

This table reports results of the difference-in-differences analysis of balance sheet measures of asset and loan risk (Panel A) and financing risk (Panel B). The DD specification that is estimated is $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, and $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group. The period considered is the run-up to the crisis. Columns 1 and 2 report baseline DD estimates for the Announced IPOs Sample. Columns 3 and 4 report robustness DD estimates for the Completed M&As Sample. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Analysis of Balance Sheet Measures of Asset and Loan Risk				
	Announced IPOs Sample		Completed M&As Sample	
	RWA/A	RRE/Tot Loan	RWA/A	RRE/Tot Loan
	[1]	[2]	[3]	[4]
After*Treatment	0.371***	0.080***	0.056***	0.061***
	(0.116)	(0.013)	(0.014)	(0.009)
After	-0.137	-0.015	0.000	-0.005
	(0.206)	(0.012)	(0.017)	(0.007)
Total Assets	-0.015	0.048***	0.028	-0.015**
	(0.030)	(0.014)	(0.032)	(0.007)
Relative Size			0.015*	0.079***
			(0.008)	(0.023)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	10,312	10,312
Adj-R^2	0.385	0.905	0.594	0.513
Panel B: Analysis of Balance Sheet Measures of Financing Risk				
	Announced IPOs Sample		Completed M&As Sample	
	Tier 1 Capital Ratio	Volatile Liabilities	Tier 1 Capital Ratio	Volatile Liabilities
	[1]	[2]	[3]	[4]
After*Treatment	-0.010***	0.039***	-0.015**	0.031***
	(0.003)	(0.008)	(0.006)	(0.009)
After	0.005	-0.013	0.006	0.016
	(0.004)	(0.011)	(0.005)	(0.020)
Total Assets	-0.000	0.017	0.017**	0.008
	(0.002)	(0.013)	(0.008)	(0.007)
Relative Size			-0.025**	-0.014***
			(0.011)	(0.002)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	10,312	10,312
Adj-R^2	0.895	0.629	0.406	0.460

Table 6: Analysis of the Mechanism: Impact on Supervisory Ratings Controlling for Observable Measures of Risk

This table reports results of a first battery of tests to corroborate the short-termism interpretation of the main difference-in-differences analysis. We report results of additional difference-in-differences analysis of the overall supervisory rating, the composite CAMELS, and its sub-components, controlling for observable measures of risk. The DD specification that is estimated is as in Panel A of Table 3 for the Announced IPOs Sample, to which we add controls for the balance-sheet measures of risk used in Table 5. The period considered is the run-up to the crisis. Each column shows results for each of the supervisory ratings used in the main analysis, in turn, for a specification that adds to the baseline controls the respective observable balance-sheet risk measures. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

	Composite CAMELS	Weak Composite CAMELS	A Rating	C, L Ratings	Risk Rating
	[1]	[2]	[3]	[4]	[5]
After*Treatment	0.232***	0.069***	0.371***	0.299**	0.308***
	(0.082)	(0.018)	(0.076)	(0.123)	(0.114)
After	-0.186	-0.019	-0.032	-0.133	-0.116
	(0.177)	(0.043)	(0.169)	(0.121)	(0.105)
Total Assets	0.004	0.023	-0.001	-0.007	0.074
	(0.051)	(0.021)	(0.046)	(0.040)	(0.069)
RWA/A	0.055	0.003	0.062		
	(0.026)	(0.011)	(0.039)		
RRE/Tot Loan	0.058	0.021	0.050		
	(0.040)	(0.023)	(0.046)		
Tier 1 Capital	-0.035	-0.017***		-0.080***	-0.044
	(0.033)	(0.006)		(0.029)	(0.029)
Vol. Liabilities	0.053**	0.006		0.094***	0.040**
	(0.022)	(0.005)		(0.015)	(0.017)
Bank FE	Yes	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	8,237	8,237	8,237

Table 7: Analysis of the Mechanism: Earnings Quality and Dynamics of Performance and Risk

This table reports results of a second battery of tests to corroborate the short-termism interpretation of the main difference-in-differences analysis. Reported estimates are for the Announced IPOs Sample. Panel A reports results of an additional battery of tests to corroborate the short-termism interpretation of the main difference-in-differences analysis. We report results of a calendar-time analysis of the evolution of a bank's operating performance as measured by ROE (Row 1) and the sub-component supervisory rating for earnings risk (E, Row 2) after the quarter when it announces a private-to-public transition ($t = 0$). The specification that is estimated is $Y_{it+N} - Y_{it-1} = \beta_1 Treatment_i + \gamma Z_{it} + \mu_t + \varepsilon_{it}$, where *Treatment* is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group, and N is the number of quarters since the quarter when the private-to-public transition is announced. The period considered is the run-up to the crisis. Panel B reports results of difference-in-differences analysis of bank decisions related to earning and management quality (Columns 1 and 2). The DD specification that is estimated is the same as the baseline specification used in Panel A of Table 3: $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, and *Treatment* is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group. The period considered is the run-up to the crisis. Columns 3 and 4 examine the dynamic relation between the overall supervisory rating, the composite CAMELS, and additional measures of bank performance, expected long-term earnings growth and earnings quality, after the IPO. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Dynamic Analysis of Bank Performance and Risk after IPOs, Announced IPOs Sample				
	Y_{t+1}-Y_{t-1}	Y_{t+4}-Y_{t-1}	Y_{t+8}-Y_{t-1}	Y_{t+16}-Y_{t-1}
	[1]	[2]	[3]	[4]
[1] Y=ROE	0.002	0.007**	-0.001	-0.013**
	(0.003)	(0.003)	(0.004)	(0.006)
[2] Y=E Rating	-0.043	0.083	0.102**	0.363***
	(0.052)	(0.134)	(0.050)	(0.157)
Bank Controls	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	528	509	443	289
Freq. of Public	0.77	0.76	0.78	0.77

Panel B: Analysis of Earnings Management and Quality, Announced IPOs Sample				
	Discretionary LLP/ Loans	Loan Loss Prov./ Delinquencies	IBES ΔEPS^{LT}	Earnings Restatements
	[1]	[2]	[3]	[4]
After*Treatment	-0.006***	-0.545***		
	(0.001)	(0.206)		
After	0.005	0.185		
	(0.008)	(0.261)		
$CAMELS_{t-4}$			0.159**	
			(0.074)	
$CAMELS_{t-16}$				0.005***
				(0.002)
Bank FE	Yes	Yes	No	No
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	4,183	4,183

Table 8: Analysis of the Mechanism: Cross-Sectional Heterogeneity

This table reports results of a third battery of tests to corroborate the short-termism interpretation of the main difference-in-differences analysis. Reported estimates are for the Announced IPOs Sample and the period considered is the run-up to the crisis, which are both as in the baseline results of Table 3. We report results of difference-in-differences analysis of the composite CAMELS rating for a specification that allows for cross-sectional heterogeneity in the treatment effect by adding an interactive term with several short-termism proxies. The interactive DD specification that is estimated is $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \beta_3 After_{it} \times Treatment_i \times X_i + \beta_4 After_{it} \times X_i + \gamma Z_{it} + \gamma_1 After_{it} \times Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group, and X is the cumulative density function of the variable the is used to interact the treatment effect in turn in each column. We consider proxies for CEO and institutional investor short-term focus, which include the frequency of words related to short-term horizon in the transcripts of earnings conference calls or the MD&A section of the bank's annual reports to the SEC (Column 1), the average institutional investors' portfolio turnover based on Cahart (1997) (Column 2), the fraction of employee stock option grants' Black-Scholes value to total payroll (Column 3), and the (value-weighted) average duration of employee stock option grants (Column 4). Note that the term $After_{it} \times X_i$ cannot be estimated independently from $After_{it} \times Treatment_i \times X_i$ because X_i does not vary within private banks, and thus drops out of the estimation due to collinearity. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

	Interacting with CEO & Inst. ST, X=		Interacting with Employee Comp, X=	
	CEO Short-Term Disclosure	Institutional Investor Turnover	% Employee Stock Options B-S Value	Employee Stock Options Duration
	[1]	[2]	[3]	[4]
After*Treatment*X	0.669**	0.071**	0.161***	-0.208**
	(0.327)	(0.029)	(0.023)	(0.097)
After*Treatment	-0.032	0.151*	0.120**	0.448***
	(0.198)	(0.084)	(0.050)	(0.086)
After	-0.016	-0.012	-0.066	-0.060
	(0.054)	(0.083)	(0.049)	(0.050)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	5,716	7,304	4,204	5,018

Table 9: Analysis of the Mechanism: Addressing the Alternatives

This table reports results of a battery of tests that address two alternative intepretations of the main difference-in-differences analysis, bank diversification and financing. Reported estimates are for the Announced IPOs Sample and the period considered is the run-up to the crisis, which are both as in the baseline results of Table 3. We replicate the baseline DD analysis of the composite CAMELS rating of Table 3, Panel A (Columns 1-2) by estimating the same specification for sub-samples where the alternatives are less likely to be relevant, which is implemented by excluding banks that are acquirers in an M&A deal (Column 1), banks whose insiders sold most equity in the IPO as proxied by an above-median ratio of IPO secondary proceeds to total equity (Column 2), banks that issued equity via a secondary offering (Column 3), and those that raised most equity in their IPO as proxied by an above-median ratio of IPO primary proceeds to total equity (Column 4). Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

	Sub-samples of least diversifying IPOs		Sub-samples of least financially-driven IPOs	
	No Subsequent M&As	Low IPO Secondary Proceeds	No Subsequent SEOs	Low IPO Primary Proceeds
	[1]	[2]	[3]	[4]
After*Treatment	0.324***	0.305***	0.317***	0.307***
	(0.116)	(0.115)	(0.114)	(0.115)
After	-0.157	-0.134	-0.154	-0.148
	(0.254)	(0.119)	(0.252)	(0.252)
Total Assets	0.006	0.008	0.010	0.004
	(0.045)	(0.046)	(0.048)	(0.045)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	7,729	4,031	7,660	4,018

Table 10: Descriptive Evidence and Implications

This table reports descriptive evidence on the broader cross-sectional implications (Panel A) and on the implications for financial crises (Panel B) of the main difference-in-differences analysis. Panel A reports parameter estimates from OLS and fixed effects regressions of the composite CAMELS and the Weak CAMELS indicator on a dummy that equals one for commercial banks that are publicly-traded. Reported estimates are for the merged BHC-Commercial Bank Sample and the period considered is the run-up to the crisis. Panel B reports results of difference-in-differences analysis of a metric of bank performance, ROE, for a specification that allows for time-series heterogeneity in the treatment effect by adding an interactive term with a crisis dummy. Specifically, the interactive DD specification that is estimated is $Performance_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \beta_3 After_{it} \times Treatment_i \times Crisis_t + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, *Treatment* is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group, and *Crisis* is an indicator variable that takes a value of one for all quarters between 2007Q4 and 2009Q4. The period considered is the overall period including the crisis. Column 1 reports results for the full sample. Columns 2-4 report results for sub-samples of relatively more short-term oriented public banks based on the following proxies for short-term investor and bank horizons: above-median pre-crisis average institutional investors' portfolio turnover based on Cahart (1997) (Column 2), above-median pre-crisis fraction of employee stock option grants' Black-Scholes value to total payroll (Column 3), and below-median pre-crisis (value-weighted) average duration of employee stock option grants (Column 4). Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: OLS & FE Analysis of Supervisory Ratings				
	Composite CAMELS		Weak Composite CAMELS	
	OLS	FE	OLS	FE
	[1]	[2]	[3]	[4]
Public BHC	0.145***	0.089***	0.059***	0.053***
	(0.005)	(0.016)	(0.003)	(0.010)
Total Assets	-0.060***	0.015	-0.025***	-0.006*
	(0.001)	(0.005)	(0.001)	(0.004)
Bank FE	No	Yes	No	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	90,733	90,733	90,733	90,733
Panel B: Analysis of Performance During the Crisis, Announced IPOs Sample, Y=ROE				
	Full Sample	High Inst. Inv. Turnover	High % Employee Options B-S Value	Low Emp. Stock Option Duration
	[1]	[2]	[3]	[4]
After*Treatment*Crisis	-0.028***	-0.034***	-0.053***	-0.052***
	(0.003)	(0.005)	(0.002)	(0.002)
After*Treatment	0.001	-0.001	0.009	0.001
	(0.001)	(0.003)	(0.007)	(0.004)
After	-0.002	-0.005	-0.005	-0.004
	(0.002)	(0.004)	(0.004)	(0.004)
Implied Treatment Effect During the Crisis	[-0.027]	[-0.035]	[-0.044]	[-0.051]
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	18,260	10,075	5,749	6,951

Figure 1: The Growth of Public Banking

This figure describes the evolution of aggregate total assets in the U.S. commercial banking sector from 1990 to 2014. Aggregate total assets of commercial banks are measured as the sum of consolidated assets reported by each commercial bank in its Call Report filing for the universe of U.S. filers. Note that this definition does not include nonbank assets of bank holding companies (BHCs), which would equal to the difference between total assets as reported by BHCs in their Y-9C and those of commercial bank assets as defined in the figure. For each commercial bank, we estimate the ownership status of its (top-holder) BHC based on a NIC indicator for whether the BHC's securities are traded and are subject to registration, or it is required to report to the SEC. The figure shows the growth rate of aggregate total assets of U.S. commercial banks that are held by a publicly-traded BHC and of U.S. commercial banks that are held by a privately-held BHC from 1990 to 2014. Specifically, we plot each of the two series scaled by its respective 1990Q1 level. Sources: National Information Center (NIC) and Call Reports.

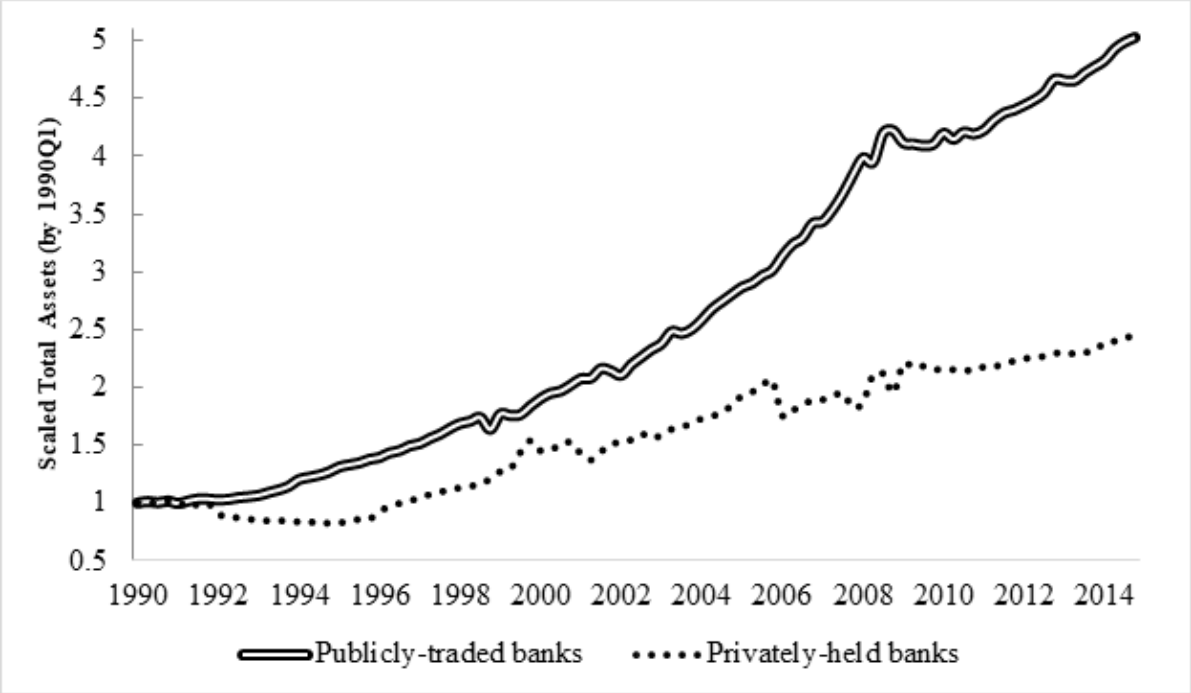
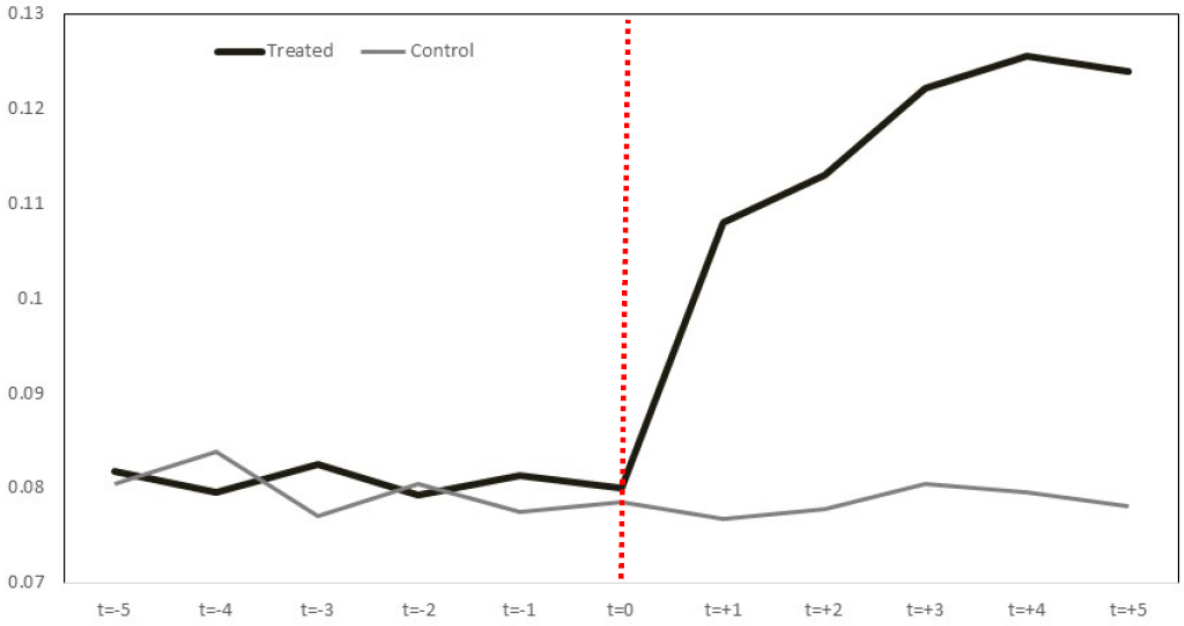


Figure 2: Bank Risk Taking Before and After a Private-to-Public Transition

This figure shows the likelihood (average annual frequency) of the Weak CAMELS indicator (vertical axis) in event time leading to and after the year when a bank announces a private-to-public transition (t=0) for treated (the black line) and control banks (the gray line). The results are for the baseline identification sub-sample, the Announced IPOs Sample, which is defined as those commercial banks in our merged BHC-Commercial Bank Sample that over the sample period announce and either complete ("treatment" group) or withdraw ("control" group) a switch from being held by a privately-held BHC to a publicly-traded BHC. The announced switches are due to an IPO, which leads to a sample of 17,754 commercial bank-quarter observations involving 276 unique BHCs and 528 unique commercial banks between 1990 and 2012. Observations to the left (right) of the t=0 line correspond to years before (after) transition announcement.



Internet Appendix For "The Stock Market and Bank Risk Taking"

Table A.1: Difference-in-Differences Analysis, Additional Robustness Checks

This table reports results of additional matched-sample analysis of the overall supervisory rating, the composite CAMELS. The specification that is estimated is the same as in Panel B of Table 3, $CAMELS_{it} - \overline{CAMELS}_{-it} = \beta After_{it} + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise. To implement the estimator, we use a methodology analogous to long-run event studies (e.g., Barber and Lyons (1997)) and for each bank-quarter in the treatment group construct a "benchmark" CAMELS, $\overline{CAMELS}_{-it}$, for a matched portfolio of banks in the control group. The period considered is the run-up to the crisis and the starting sample is the Announced IPOs Sample. Columns 1 and 2 reports results of fixed-effects before-after analysis for the sub-samples of completed IPOs (the "treatment" group) and cancelled IPOs (the "control" group), respectively. Columns 3 and 4 report results of additional matching analysis where the procedure used to choose a match is the same as in Table 3, propensity score matching, but using either a different set of covariates for matching, which are just year and commercial bank pre-transition average rating in Column 3, or a different control group, which comprises all private banks in Column 4. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Robustness Analysis for IPO Sample, Composite CAMELS Rating				
	FE, Treated Only	FE, Control Only	Matching, Time and Rating	Matching, Alternative Control Group
	[1]	[2]	[3]	[4]
After	0.200***	-0.085	0.250***	0.177***
	(0.054)	(0.278)	(0.062)	(0.056)
Total Assets	-0.011	-0.009	-0.019	-0.041
	(0.018)	(0.021)	(0.018)	(0.039)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	6,728	1,509	6,728	6,728
Panel B: Robustness Analysis for IPO Sample, Weak Composite CAMELS Rating				
After	0.079***	-0.010	0.084***	0.093***
	(0.020)	(0.039)	(0.027)	(0.027)
Total Assets	-0.005	-0.002	-0.021***	-0.027
	(0.018)	(0.009)	(0.007)	(0.028)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	6,728	1,509	6,728	6,728

Table A.2: Difference-in-Differences Analysis, Additional Robustness Checks

Panel A of this table reports results of additional robustness checks for the baseline difference-in-differences analysis of the overall supervisory rating, the composite CAMELS. The DD specification that is estimated is as in Panel A of Table 3 for the Announced IPOs Sample. The period considered is the run-up to the crisis. Column 1 adds higher order controls for bank size. Columns 2 to 4 consider alternative definitions of the dependent variable: a composite CAMELS rating of 4 or worse (Column 2), a component CAMELS rating of 4 or worse (Column 3), and the BHC-level composite CAMELS rating (Column 4). Column 5 limits the sample to a (-3, +3) years window around the IPO announcement. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Additional DD Analysis of the Composite CAMELS Rating					
	High Order Size Controls [1]	Really Weak Composite [2]	Really Weak Component [3]	BHC-level Composite [4]	(-3, +3) year Window [5]
After*Treatment	0.322***	0.011***	0.122**	0.233***	0.227***
	(0.112)	(0.004)	(0.058)	(0.089)	(0.074)
After	-0.188	-0.003	-0.041	-0.073	-0.086
	(0.249)	(0.004)	(0.049)	(0.084)	(0.078)
Total Assets	-2.174	-0.003	-0.007	-0.037	-0.061
	(3.808)	(0.004)	(0.008)	(0.057)	(0.061)
Total Assets^2	0.180				
	(0.276)				
Total Assets^3	-0.005				
	(0.007)				
Bank FE	Yes	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Number of Obs.	8,237	8,237	8,237	8,237	6,972

Table A.3: Instrumental Variable (2SLS-IV) Analysis, Placebo Test

This table reports tests of the validity of the S&P Bank Index as an instrument for deal completion in the two-stage least square (2SLS) instrumental variable analysis of Table 3, Panel B (Columns 1-2) that uses the S&P Bank Index as an instrument for deal completion. Panel A reports OLS estimates from a linear probability model relating the likelihood of a deal succeeding to alternative definitions of S&P Bank Index and to the pre-announcement characteristics of the commercial bank involved. Filer year dummies are included in all regressions. Panels B-D report placebo tests of the validity of the exclusion restriction. The dependent variable is the average of the composite CAMELS rating after IPO. Panel B reports OLS estimates for alternative definitions of the S&P Bank Index drop in the two-month window following either the completion or the withdrawal of an IPO attempt. Panels C-D reports OLS estimates for alternative definitions of the S&P Bank Index drop in the two-month window from a year before and from a year after the IPO announcement, respectively. Filer year dummies are included in all regressions. Standard errors (in parentheses) are robust, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Validity Test – Probability of Deal Succeeding			
	(1)	(2)	(3)
S&P Bank Index	0.293***		
	(0.099)		
Percentile CDF of S&P Bank Index		0.081***	
		(0.024)	
Bottom 25% of S&P Bank Index			-0.054***
			(0.015)
Filing Year Effects	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes
Number of Obs.	528	528	528
Adj-R^2	0.127	0.124	0.125
F-stat	51.10	48.25	38.34
Panel B: Placebo Test – CAMELS and the S&P Bank Index Following IPO Outcome			
S&P Bank Index	-0.009		
	(0.171)		
Percentile CDF of S&P Bank Index		-0.001	
		(0.055)	
Bottom 25% of S&P Bank Index			-0.017
			(0.042)
Filing Year Effects	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes
Number of Obs.	528	528	528
Panel C: Placebo Test – CAMELS and the S&P Bank Index in Year Before IPO Announcement			
S&P Bank Index	-0.129		
	(0.135)		
Percentile CDF of S&P Bank Index		-0.039	
		(0.068)	
Bottom 25% of S&P Bank Index			0.033
			(0.056)
Filing Year Effects	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes
Number of Obs.	528	528	528
Panel D: Placebo Test – CAMELS and the S&P Bank Index in Year After IPO Announcement			
S&P Bank Index	0.041		
	(0.125)		
Percentile CDF of S&P Bank Index		0.019	
		(0.053)	
Bottom 25% of S&P Bank Index			0.001
			(0.037)
Filing Year Effects	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes
Number of Obs.	528	528	528

Table A.4: Additional Analysis of Bank Decisions and Performance

This table reports results of additional difference-in-differences analysis of bank decisions and performance. The DD specification that is estimated as well as the sample used are the same as in the baseline analysis of Table 3, Panel A (Columns 1-2). Detailed variable definitions are in the Appendix. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

	Hot Money/ Total Assets	Maturity Mismatch	Total Assets	Non-Deposit Fee Income	(In-)Efficiency Ratio
	[1]	[2]	[3]	[4]	[5]
After*Treatment	0.017***	2.907***	0.005	0.004***	0.038***
	(0.006)	(0.636)	(0.061)	(0.001)	(0.010)
After	-0.004	-0.667	0.003	-0.001	-0.013
	(0.006)	(1.171)	(0.048)	(0.001)	(0.036)
Bank FE	Yes	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Number of Obs.	8,237	7,805	8,237	8,237	8,237

Appendix Table A.5: Additional Analysis of the Mechanism

Panel A of this table reports results of additional analysis to corroborate the short-termism interpretation of the main difference-in-differences analysis. Reported estimates are for the Announced IPOs Sample and the period considered is the run-up to the crisis, which are both as in the baseline results of Table 3. We report results of difference-in-differences analysis of the composite CAMELS rating for a specification that allows for cross-sectional heterogeneity in the treatment effect by adding an interactive term with several short-termism proxies. The interactive DD specification that is estimated is the same as in Table 8, $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \beta_3 After_{it} \times Treatment_i \times X_i + \beta_4 After_{it} \times X_i + \gamma Z_{it} + \gamma_1 After_{it} \times Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group, and X is the cumulative density function of the variable the is used to interact the treatment effect in turn in each column. The additional proxies considered are: the frequency of CEO net-sales of stock (Column 1), the percentage ownership by "transient" institutions based on Bushee (1998) (Column 2). the fraction of CEO stock and stock option grants that has not yet vested (Columns 3 and 4, respectively). Note that the term $After_{it} \times X_i$ cannot be estimated independently from $After_{it} \times Treatment_i \times X_i$ because X_i does not vary within private banks, and thus drops out of the estimation due to collinearity. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Heterogeneity by Short-Termism (ST) & CEO Equity Compensation, Announced IPOs Sample				
	Interacting with CEO & Inst. ST, X=		Interacting with CEO Comp, X=	
	CEO Trading	Transient Institutional Investors	% CEO Stock Unvested	% CEO Options Unvested
	[1]	[2]	[3]	[4]
After*Treatment*X	0.150***	0.091**	-0.481***	-0.130*
	(0.044)	(0.039)	(0.169)	(0.069)
After*Treatment	0.194***	0.195***	0.303***	0.143**
	(0.065)	(0.063)	(0.106)	(0.073)
After	-0.053	-0.015	-0.058	-0.061
	(0.056)	(0.056)	(0.051)	(0.052)
Bank FE	Yes	Yes	Yes	Yes
Supervisor FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Number of Obs.	5,060	7,218	5,029	5,028

Table A.5: Additional Analysis of the Mechanism (Continued)

Panel B of this table reports results of an additional battery of tests that address two alternative intepretations of the main difference-in-differences analysis, bank diversification and financing. Reported estimates are for the Announced IPOs Sample and the period considered is the run-up to the crisis, which are both as in the baseline results of Table 3. Panel A reports results of difference-in-differences analysis of the composite CAMELS rating for a specification that allows for cross-sectional heterogeneity in the treatment effect by adding an interactive term. The interactive DD specification that is estimated is $RISK_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \beta_3 After_{it} \times Treatment_i \times X_i + \beta_4 After_{it} \times X_i + \gamma Z_{it} + \gamma_1 After_{it} \times Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group. The variable used to interact the treatment effect in each column, X, is a proxy for diversification or financing: the (average) pre-transition Herfindhal index of geographic concentration of bank deposits (Column 1), the difference between the fraction of shares held by insiders after the IPO and that before the IPO (available for just about a quarter of the sample, Column 2). Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel B: Controlling for Alternatives, Announced IPOs Sample		
	Interacting with Diversification, X=	
	Geo Focus (Pre-IPO)	Change in % Insider Own
	[1]	[2]
After*Treatment*X	0.104	0.016
	(0.358)	(0.015)
After*Treatment	0.215***	0.212***
	(0.050)	(0.045)
After	-0.069	-0.010
	(0.077)	(0.079)
Total Assets	-0.080	-0.086
	(0.067)	(0.058)
Bank FE	Yes	Yes
Supervisor FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Number of Obs.	8,237	2,061

Table A.6: Additional Dynamic Analysis of Bank Performance

This table reports additional dynamic analysis of bank performance. The specification that is estimated is the same as Panel A of Table 7, $Y_{it+N} - Y_{it-1} = \beta_1 Treatment_i + \gamma Z_{it} + \mu_t + \varepsilon_{it}$, where *Treatment* is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group, and N is the number of quarters since the quarter when the private-to-public transition is announced (t=0). Year-quarter dummies, bank controls, and supervisor fixed effects are included in all regressions. The sample that is used is also the same as Panel A of Table 7, the Announced IPO Sample in the run-up to the crisis. Panel A reports the detail of the full estimates for operating performance as measured by ROE in each of the sixteen quarters since the quarter when the private-to-public transition is announced. Panel B reports estimates for operating performance as measured by ROA. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

Panel A: Dynamic Analysis of Bank Performance, ROE								
	$Perf_{t+1}$-$Perf_{t-1}$	$Perf_{t+2}$-$Perf_{t-1}$	$Perf_{t+3}$-$Perf_{t-1}$	$Perf_{t+4}$-$Perf_{t-1}$	$Perf_{t+5}$-$Perf_{t-1}$	$Perf_{t+6}$-$Perf_{t-1}$	$Perf_{t+7}$-$Perf_{t-1}$	$Perf_{t+8}$-$Perf_{t-1}$
Treatment	0.002	0.004	0.005	0.007**	0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Q, Sup FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	528	521	514	509	477	451	448	443
	$Perf_{t+9}$-$Perf_{t-1}$	$Perf_{t+10}$-$Perf_{t-1}$	$Perf_{t+11}$-$Perf_{t-1}$	$Perf_{t+12}$-$Perf_{t-1}$	$Perf_{t+13}$-$Perf_{t-1}$	$Perf_{t+14}$-$Perf_{t-1}$	$Perf_{t+15}$-$Perf_{t-1}$	$Perf_{t+16}$-$Perf_{t-1}$
Treatment	-0.003	-0.001	-0.008*	-0.008**	-0.009**	-0.006	-0.009**	-0.013**
	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.006)
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Q, Sup FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	405	399	385	378	311	309	295	289
Panel B: Dynamic Analysis of Bank Performance, ROA								
	$Perf_{t+1}$-$Perf_{t-1}$	$Perf_{t+2}$-$Perf_{t-1}$	$Perf_{t+3}$-$Perf_{t-1}$	$Perf_{t+4}$-$Perf_{t-1}$	$Perf_{t+5}$-$Perf_{t-1}$	$Perf_{t+6}$-$Perf_{t-1}$	$Perf_{t+7}$-$Perf_{t-1}$	$Perf_{t+8}$-$Perf_{t-1}$
Treatment	0.000	0.000	0.000	0.001**	0.001	0.001**	0.001**	-0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Q, Sup FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	528	521	514	509	477	451	448	443
	$Perf_{t+9}$-$Perf_{t-1}$	$Perf_{t+10}$-$Perf_{t-1}$	$Perf_{t+11}$-$Perf_{t-1}$	$Perf_{t+12}$-$Perf_{t-1}$	$Perf_{t+13}$-$Perf_{t-1}$	$Perf_{t+14}$-$Perf_{t-1}$	$Perf_{t+15}$-$Perf_{t-1}$	$Perf_{t+16}$-$Perf_{t-1}$
Treatment	-0.001	-0.001	-0.002*	-0.002**	-0.001	-0.002**	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Q, Sup FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	405	399	385	378	311	309	295	289

Table A.7: Additional Analysis of Bank Performance During the Crisis

This table reports analysis of bank performance during the crisis for several additional measures of bank performance. The specification that is estimated is the same as Panel B of Table 10, $Performance_{it} = \beta_1 After_{it} + \beta_2 After_{it} \times Treatment_i + \beta_3 After_{it} \times Treatment_i \times Crisis_t + \gamma Z_{it} + \mu_t + a_i + \varepsilon_{it}$, where $After$ is an indicator variable that takes a value of one for all the quarters after the announcement date and zero otherwise, $Treatment$ is an indicator variable that takes a value of one for commercial banks in the treatment group and zero for those in the control group, and $Crisis$ is an indicator variable that takes a value of one for all quarters between 2007Q4 and 2009Q4. Year-quarter dummies as well as commercial bank and supervisor fixed effects are included in all regressions. The sample used is also the same as Panel B of Table 10, the Announced IPO Sample in the overall period including the crisis. Standard errors (in parentheses) are clustered at the BHC level, with ***, **, and * denoting significance at the 1%, 5%, and 10% level, respectively.

	ROE	ROA	Non Performing Loans/Assets	Loan Loss Provisions/Assets	Net Interest Margin	Overhead Costs Ratio	Delinquencies/ Loan Loss Reserves	Noncurrent Loan Ratio
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Panel A: Additional Analysis of Bank Performance During the Crisis								
After*Treatment*Crisis	-0.028***	-0.002***	0.014***	0.008***	-0.003***	0.039***	0.544***	0.018***
	(0.003)	(0.000)	(0.002)	(0.001)	(0.001)	(0.009)	(0.076)	(0.003)
After*Treatment	0.001	-0.000	-0.002**	0.002	-0.004**	-0.015*	0.065	0.001
	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.008)	(0.124)	(0.003)
After	-0.002	0.000	-0.001	-0.002	-0.000	-0.002	-0.285	-0.005
	(0.002)	(0.000)	(0.001)	(0.001)	(0.002)	(0.006)	(0.298)	(0.005)
Implied Treatment Effect During the Crisis	[-0.027]	[-0.002]	[0.012]	[0.010]	[-0.007]	[0.024]	[0.609]	[0.019]
Bank Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supervisor Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	18,260	18,260	18,260	18,198	18,260	18,209	18,234	18,246

Figure A.1 The Growth of Public Banking

This figure describes the evolution of aggregate total assets in the U.S. commercial banking sector from 1990 to 2014. Aggregate total assets of commercial banks are measured as the sum of consolidated assets reported by each commercial bank in its Call Report filing for the universe of U.S. filers. Note that this definition does not include nonbank assets of bank holding companies (BHCs), which would equal to the difference between total assets as reported by BHCs in their Y-9C and those of commercial bank assets as defined in the figure. For each commercial bank, we estimate the ownership status of its (top-holder) BHC based on a NIC indicator for whether the BHC's securities are traded and are subject to registration, or it is required to report to the SEC. The figure shows the level of aggregate total assets of U.S. commercial banks that are held by a publicly-traded BHC and of U.S. commercial banks that are held by a privately-held BHC from 1990 to 2014. Sources: National Information Center (NIC) and Call Reports.