Large Capital Infusions, Investor Reactions, and the Return- and Risk-Performance of Financial Institutions over the Business Cycle

Elyas Elyasiani
Fox School of Business and Management, Temple University

Loretta J. Mester
Federal Reserve Bank of Philadelphia
and The Wharton School, University of Pennsylvania

Michael S. Pagano*
Villanova School of Business, Villanova University

First draft: January 15, 2010
This draft: March 14, 2012

JEL Codes: F3, G15
Keywords: Securities Issuance, Market Reaction,
Financial Service Firms, Commercial Banks, Government Intervention

---

*Correspondence to Elyasiani at Fox School of Business, Temple University, Philadelphia, PA 19122, E-mail: elyas@temple.edu.. To Pagano at Villanova University, Villanova School of Business, Department of Finance, 800 Lancaster Avenue, Villanova, PA 19085, Phone: (610) 519-4389, Fax: (610) 519-6881, E-mail: Michael.Pagano@villanova.edu. To Mester at Research Department, Federal Reserve Bank of Philadelphia, Ten Independence Mall, Philadelphia, PA 19106-1574, E-mail: Loretta.Mester@phil.frb.org.

The authors thank Lamont Black, John Boyd, Ken Cyree, David Fissel, Ed Kane, Paul Kupiec, Lars Norden, George Papaioannou, Gizelle Piretti, Viorel Roscovan, Andrew Spieler, Cristof Stahel, Haluk Unal, and Andrew Winton, as well as participants at the 10th Annual FDIC-JFSR Bank Research Conference, 2010 Southern Finance Association meeting, 2011 Financial Intermediation Research Society annual conference, 2011 International Finance and Banking Society meeting, and the Hofstra University seminar for their helpful comments, John Hyland, Taylor LaBarr, Scott Williams, Cara Stepanczuk, Meng Wang, and Ling Zhang for research assistance, and Sally Burke for editorial assistance. The views expressed in this paper are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of Philadelphia or of the Federal Reserve System. This paper is available free of charge at www.philadelphiafed.org/research-and-data/publications/working-papers/.

Large Capital Infusions, Investor Reactions, and the Return- and Risk-Performance of Financial Institutions over the Business Cycle

Abstract

We examine investors' reactions to announcements of large seasoned equity offerings (SEOs) by U.S. financial institutions (FIs) from 2000 to 2009. These offerings include private market infusions as well as injections of government capital under the Troubled Asset Relief Program (TARP). The sample period covers both business cycle expansions and contractions, and the recent financial crisis. We present evidence on the factors affecting FI decisions to issue capital, the determinants of investor reactions, and post-SEO performance of issuers, as well as a sample of matching FIs. Investors reacted negatively to the news of private market SEOs by FIs, both in the immediate term (e.g., the two days surrounding the announcement) and over the subsequent year, but positively to TARP injections. Reactions differed depending on the characteristics of the FIs, and the stage of the business cycle. More financially constrained institutions were more likely to have raised capital through private market offerings during the period prior to TARP, and firms receiving a TARP injection tended to be more levered, and more likely to be a commercial banking or a thrift institution than other type of firm. We find that TARP allowed FIs to increase their lending (as a share of assets), raise their credit risk, and lower liquidity risk, possibly by funding new loans with more stable financing sources such as traditional core deposits. However, we find no evidence that banks' capital adequacy increased after the capital injections. We find that the effects of capital injections on FI performance differed during the two recessionary periods, 2001 and 2007.

1. Introduction

Proper functioning of a nation's capital markets to efficiently raise and allocate capital is an integral part of a healthy and growing economy. The importance of capital market dynamics was clearly demonstrated during the financial crisis of 2007-2009, one of the worst in U.S. history, when some markets stopped functioning and many of the largest financial institutions (FIs) around the world found themselves needing to raise a large amount of capital precisely when it was very difficult to do so.[1] To moderate the effects of this crisis, the U.S. government established the Troubled Asset Relief Program (TARP) to recapitalize undercapitalized FIs. In addition, recent regulatory changes, including the Dodd-Frank Act, Basel III, and changes to the European Union capital rules, all underscore the important role of capital at FIs. Since a firm's decision to raise additional capital can alter its cash flows, growth prospects, and risk-taking incentives, it is important to understand how investors react when FIs issue large amounts of equity capital via seasoned offerings through traditional capital markets or through non-market sources such as TARP.

We use event study and panel regression methods to investigate the immediate and longer-term effects of the seasoned equity offering (SEO) announcements for a broad set of publicly traded FIs during 2000-2009. Our study is the first to investigate whether investor reactions to equity offerings by FIs are different over the expansion and contraction phases of the business cycle compared to more normal economic conditions, and whether the reaction to U.S. government TARP injections is similar to that of market capital injections from private investors. In this way, we differ from Bayazitova and Shivdasani (2011), Black and Hazelwood (2010), and

[1] Vice Chair of the Federal Reserve Board Janet Yellen (2009) has suggested that "*if anyone ever needed a demonstration on the strength of the links between the functioning of the financial system and the functioning of the economy, then this is it. …a genuine crisis in financial markets has generated a severe credit crunch. The credit crunch in turn has left households and firms with fewer resources to finance spending, and as a result, output growth has weakened and unemployment has risen*."

others who examine solely the TARP program. In addition, unlike Krishnan, Ergungor, Laux, Singh, and Zebedee (2010), we include SEOs both prior to 2006 and after 2006. In particular, we study the impact of capital injections by all forms of U.S. FIs (banks, securities brokers, insurers, money managers, etc.) over the 2000-2009 period including those of the recent TARP injections on the receiving firms' systematic risk and risk-adjusted excess returns. Thus, our analysis shows how investors' perceptions about an FI's systematic risk and risk-taking activities changed post-SEO and post-TARP over an entire decade. Our approach, therefore, complements Bayazitova and Shivdasani's findings, which focus solely on investor reactions to an FI's decision to accept, reject, or repay TARP capital injections. In addition, we complement Krishnan, et al. (2010) by providing empirical evidence that suggests investors not only understand "opaque" FIs but also can do so across varying market conditions during a business cycle.

The literature suggests that firms can experience several advantages and disadvantages by raising capital via SEOs. The announcement of an SEO can be viewed as positive news because the firm will then be able to use the funds to exploit new business opportunities and the market may perceive these opportunities as the reason for the issuance. Moreover, the additional equity can bolster the issuing firm's capital position (reduce its financial leverage) and, thereby, mollify regulators. To the extent that investors value this reduction in risk and/or perceive that the FI will have stronger growth prospects, the firm's stock price can react positively to the announcement of an SEO.

However, SEOs can also be negative news. Myers and Majluf (1984) were the first to note that there is an adverse selection problem associated with SEOs and, thus, SEO announcements can send a negative signal about the firm's future prospects. Specifically, when

firm managers have positive inside information on their investment opportunities and are acting on behalf of the current shareholders, they may refrain from issuing new equity, preferring to use internal financing to fund investment in positive net present value projects because the new equity issues will be underpriced, as they will not fully reflect the managers' private information about the good investment opportunities (this is the so-called under-investment problem). However, if the managers have negative inside information and the firm is overvalued, they will tend to issue new equity. Similarly, bank regulators may have inside information based on bank examinations and surveillance. Hence, if they force a bank to issue new capital, it would signal to the market that the bank is in distress. In addition, a Myers (1977) type debt overhang problem might exist if the capital injection is senior to existing shareholders (as was the case with the TARP investments). Thus, shareholders might not benefit from this type of capital injection even though it may be advantageous to existing creditors. In these scenarios, issuing equity could be interpreted as bad news (or less good news) compared with not issuing equity. Thus, whether the advantages outweigh the disadvantages of issuing new equity is an important empirical question.

Some earlier studies have found negative investor reaction to bank SEOs.[2] We investigate whether this finding holds in our broader data set of SEOs and whether the signs of

[2] Other than the more recent analysis of bank SEOs by Krishnan et al. (2010) noted above, most studies of investor reaction to SEOs by commercial banks have focused mainly on short-term announcement effects using small samples of firms and relatively brief time periods (typically fewer than 100 firms and fewer than 10 years of data). These studies usually find either negative or, at times, insignificant short-term abnormal returns in response to SEO announcements, with the magnitude of the effect varying based on the level of the bank's capital adequacy (leverage), as well as whether the bank is a repetitive SEO issuer (see, e.g., Polonchek, et al., 1989; Keeley, 1989; Slovin, et al., 1991; and Cornett and Tehranian, 1994). Slovin, et al. (1992) suggest that there are also negative contagion effects on rival commercial and investment banks when money center banks issue SEOs. Further, Slovin, et al., (1999) find a similar negative contagion effect when large banks cut or omit dividend payments. More recently, Kim and Stock (2010) examine the effect of TARP preferred stock issuances on pre-existing preferred stocks and find a positive short-term reaction. Veronesi and Zingales (2010) estimate that TARP helped enhance the value of the three largest investment banks and Citigroup by reducing the likelihood of bankruptcy for these firms relative to other competitors such as J.P. Morgan Chase. In addition, King (2010) uses credit default swap (CDS) spreads and shows that government support of 52 banks in six countries during the 2008 crisis helped creditors at the

the reactions differ for TARP events versus regular SEOs or in recessions versus expansions. All else equal, receiving a government injection might be perceived as a negative signal if it was interpreted as a signal of financial distress and excessively diluted existing shareholders. However, in a very poor economic environment in which investors expect many firms to fail, receiving government funding could be interpreted as positive news because it might be seen as a "vote of confidence" in the FI's prospects by the government and/or as a sign that the firm was "too-big-to-fail" and would receive a government-led rescue, if needed. Thus, the reaction to TARP injections may be positive to the extent that the market views the injection as an indication of better prospects for the firm going forward.[3,4] The reaction to market injections might also differ during times of stress like the recent financial crisis than at other times because of the signal that risk-averse investors take from an announcement to raise capital at such a time. Similarly, reactions might vary in recessions versus expansions, especially if investors are risk-averse and their risk-aversion varies in tandem with economic conditions. Along the same lines, investors' reactions to a firm's decision to issue a large amount of equity capital may be sensitive to firm characteristics.

Our main findings are: (1) On average, investors reacted *negatively* to the news of market SEO announcements in the short term (i.e., in the two days surrounding the announcement) and over the subsequent year, but they reacted *positively* to the news of a TARP injection. In terms of magnitude, the cumulative abnormal returns over days 0 and +1 for issuers were −57 to −60

---

expense of shareholders (because CDS spreads fell while bank stock prices briefly responded positively before continuing to decline in all countries except the U.S.).

[3] Ng, Vasvari, and Wittenberg-Moerman (2010) find evidence that healthier banks were selected to be participants in TARP's Capital Purchase Program. In addition, Bayazitova and Shivdasani (2010) confirm Ng et al's finding and report positive initial investor reactions to TARP announcements.

[4] In a different setting, Gasparro and Pagano (2010) find that another class of long-term investors, namely, sovereign wealth funds, can have important positive and negative effects on a firm's equity value due to the potentially stabilizing and de-stabilizing effects of this unique type of long-term, quasi-government investment firm.

basis points (bps) in non-TARP events and +100 to +123 bps in TARP events. For all issuers, the risk-adjusted excess return (measured by the alpha from a market model regression) was significantly lower, while the systematic risk (market beta) for TARP issuers was significantly higher in the year after injections than in the year before. In contrast to other studies, by studying pre- and post-SEO levels of systematic risk, we can quantify the impact of these equity offerings on a firm's cost of capital. For example, we find that the increase in beta for all issuers is economically, as well as statistically, significant, representing an 85-basis-point rise in the average cost of equity capital after issuance (assuming a 5% equity risk premium). We also observe that issuers tended to have higher betas prior to issuance than non-issuers of similar asset size (0.80 vs. 0.72) and that the gap widened subsequent to the issuance. Issuers and non-issuers tend to have similar alphas before issuance, but the issuer's alpha declined more sharply after the SEO. TARP issuers tended to have lower alphas and higher betas both before and after issuance compared to the private market SEO issuers. Thus, TARP issuers were relatively riskier than other private issuers.

(2) Investor reactions to the announcements of large SEOs are significantly related to certain characteristics of the issuing FI and the size of the issuance. For both TARP and non-TARP injections, the post-announcement systematic risk (beta) is higher for larger FIs, while FIs with non-TARP issues were also typically more profitable, and better capitalized.

(3) Investor reactions differ depending on the state of the business cycle and conditions of financial crisis. During recessions, investors reacted positively to non-TARP capital infusions (as indicated by higher post-SEO alpha and lower post-SEO beta), possibly because being able to raise capital during weak economic conditions is viewed as a favorable signal by investors. However, reactions during the 2007-2009 recession were different. In particular, equity

offerings by FIs during this recessionary/crisis period were followed by significantly higher systematic risk, as measured by beta, and by significantly lower risk-adjusted excess returns, as measured by alpha, for TARP recipients.

(4) Factors that influence the decision to raise capital from private investors are different from those found to influence government-initiated TARP injections. Financial firms with lower dividend payments (an indicator of being more cash-flow constrained) were more likely to issue new non-TARP equity, perhaps because they were less able to use internal financing. While more leveraged firms (lower equity-to-asset ratios) were more likely to get a TARP injection than not to get one, TARP issuers also tended to be concentrated in the banking and thrift sectors of the financial services industry. The fact that banks and thrifts were somewhat less likely to have issued private market equity during 2000-2007 may have necessitated TARP funding for these firms during this period. .

(5) The post-SEO financial performance of the issuing FIs and their matching non-issuing firms is strongly related to their past performance, whether the capital injection was private or government-based, and whether it occurred during a recession. We find evidence that firms that raised capital either through a private market issuance or via TARP had higher lending (as a share of assets) in the year after the issuance compared to the year before, and that TARP recipients increased their credit risk while lowering their liquidity risk. Thus, TARP may have enabled banks to increase lending and, thereby their credit risk. But they appear to have accomplished this by financing these loans more with traditional core deposits, which, in turn, lowered their liquidity risk. We also find no evidence that banks' capital adequacy increased after the capital injection.

Taken together, our findings suggest that investor reactions to SEOs by U.S. FIs vary in a rational and systematic way in response to differences in economic and firm-specific conditions, as well as the type of investor (private market or government) that was involved in the offering.[5] These reactions have certain policy implications. For example, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 authorizes the Fed to issue countercyclical capital requirements for BHCs, which would strengthen capital requirements during expansions as part of macroprudential capital policies. Our results suggest that investors react negatively to SEOs during good economic times (alpha decreases and beta increases in the year after issuance) and more positively to SEOs during recessions. While these reactions may change over time as investors better understand the new regulatory regime, our results suggest that investors might misconstrue capital issuance during expansions as a negative signal of future economic prospects, thereby making the new regulatory policy more costly to implement.

The rest of the paper is organized as follows. Section 2 describes our data, empirical questions and models. Section 3 presents our empirical results, and Section 4 provides the conclusions.

2. Data and model specification

2.1 Data

We combine data from SNL Financial, the Center for Research in Security Prices (CRSP), and Compustat, and after filtering for outliers, we obtain usable data on the announcements of 356 large SEOs of publicly traded FIs over 2000-2009. These FIs include

[5] These findings are consistent with recent research that examines investors' reactions to other financial choices during the financial crisis and over the business cycle. For example, Gasparro and Pagano (2010) analyze how investors react to sovereign wealth fund investments in large FIs and report that investors respond differently depending on the source of the capital injections. Also, Cangemi, Mason, and Pagano (2011) show how bond recovery rates vary in a systematic way over the business cycle since the debt renegotiation process between bondholders and shareholders can be interpreted as a real options problem.

commercial banks, thrifts, securities, insurance, investment management, and other financial firms within SIC codes 6000-6799; 267 different FIs issued these offerings during the sample period.[6] Figure 1 shows the number of SEOs for each year of our sample, while Figure 2 displays the breakdown of these SEOs across the various SIC codes, with the majority of SEOs being issued by depository FIs (SIC codes 6000-6099). We define large capital infusions as infusions greater than 10% of the firm's existing common equity. Of the 356 large SEOs, 125 were TARP injections and 231 were offerings in the private capital market (which we will call non-TARP issues).[7] For each issuing FI, we randomly match an FI that did not have an SEO of any size during the 500 trading days surrounding the announcement of the issuing firm's capital infusion, and that is similar in asset size (e.g., typically within 12% or $250 million of the issuer's total assets) and is in the same 3-digit SIC code (or closest SIC code) as the issuing FI. Thus, our sample has a total of 712 FIs.[8]

---

[6] We focus on FIs because of their uniqueness as delegated monitors of borrowers, allocators of credit across major economic sectors, and administrators of the national payment system (Saunders and Cornett, 2008), and their contribution to the onset of the financial crisis due to potential spillovers of financial sector shocks to the rest of the economy. We concentrate on SEOs, rather than initial public offering (IPOs), because we are interested in examining the impact of capital issuance from larger, more established financial firms, which exert disproportionate influences on the financial system as a whole. The vast majority (77%) of FIs in our sample issued only one SEO during 2000-2009. However, 61 FIs (23%) issued more than one SEO, with nearly two-thirds of these firms (67%) issuing just two SEOs during the period. Thus, less than 8% of the FIs issued more than two SEOs.

[7] We treat the TARP investments as SEOs even though technically the FIs sold preferred stock to the U.S. government. In our view, it is appropriate to treat these TARP investments as SEOs because most investors, the general public, and the FIs themselves expected the government's stakes to be repaid via future common stock sales to private investors and/or future retained earnings of the firms. Thus, like convertible debt offerings, TARP investments can be viewed as "delayed seasoned common equity offerings," where the U.S. government's funds served as an intermediate step in this SEO process. And, in practice, this is exactly what happened in the vast majority of TARP deals, as the U.S. government either converted its preferred stock into common shares and then sold them to private investors or the government claim was bought out by the FI after the firm raised new equity in the capital markets.

[8] When the TARP program was announced on October 14, 2008, it was also announced that nine FIs would participate. We also examined investor reactions to the first nine TARP recipients to see if these firms were influencing our entire sample. Thus, we performed the tests described below with a dummy variable set to 1 for these nine firms' TARP injections, as well as by dropping these financing deals from the sample. In both cases, the results were qualitatively and quantitatively similar to those reported here, so we present our results with these nine capital injections included in our sample.

2.2 Empirical questions

We investigate three major questions concerning capital injections:

(1) How do investors react to large SEOs? Do the reactions vary for TARP versus non-TARP capital injections, with the characteristics of the issuer, and with the stage of the business cycle?

(2) How is a firm's decision to raise additional capital influenced by firm characteristics and does the impact of these characteristics differ for TARP versus non-TARP injections or by stage of the business cycle?

(3) Because, ultimately, the regulatory question of whether FIs should hold more capital depends on whether holding capital affects firm performance, we ask: how does an issuing firm's post-SEO performance differ relative to that of firms that did not receive a capital injection and does this post-SEO performance depend on firm characteristics?

2.3 Empirical models

To investigate investor reactions to a financial firm's announcement of a large capital infusion, we estimate a Markowitz (1952) market model, which relates a firm's stock return to the return on the market portfolio. The coefficient on the market portfolio (the market beta) is a reflection of investors' perceptions of the firm's systematic risk, while the model's constant term, alpha, serves as a measure of the firm's risk-adjusted "excess" performance.[9] The time-series model we estimate is:

$$\kappa_{s,t} = \alpha_{0,s} + \alpha_{1,s} \cdot Event_{s,t} + \beta_{0,s} \cdot \kappa_{m,t} + \beta_{1,s} \cdot (Event_{s,t} \cdot \kappa_{m,t}) + \nu_{s,t} \qquad (1)$$

where,

$\kappa_{s,t}$ = Return during day t on the s-th firm's common stock,

[9] Classic finance theory predicts that alpha should be zero (ex ante) but a firm's decisions, such as the decision to issue equity capital, can cause alpha to deviate, positively or negatively, from zero (ex post).

$\kappa_{m,t}$ = Return during day *t* on the systematic risk factor, i.e., the "market" return (measured by the daily CRSP Value-weighted Total Return Index),

$Event_{s,t}$ = a dummy variable equal to 1 for all trading days from t−1 to t+250 that surround the *s*-th firm's announcement of its seasoned capital injection on day *t* (and zero otherwise),

$\alpha_{0,s}$ = *alpha* = the model's intercept term (a measure of risk-adjusted daily performance),

$\beta_{0,s}$ = *market beta* = a measure of the *s*-th firm's equity sensitivity to the systematic "market" risk factor,

$\alpha_{1,s}$ = change in *alpha* = intercept shift, a measure of change in the *s*-th firm's *alpha* pre-announcement to post-announcement related to $Event_{s,t}$,

$\beta_{1,s}$ = change in *beta* = slope shift, a measure of change in the *s*-th firm's market *beta* pre-announcement to post-announcement related to $Event_{s,t}$,

$\nu_{s,t}$ = a zero-mean stochastic disturbance term.

We estimate Eq. (1) using generalized method of moments (GMM) for *each* of the financial firms (issuers and non-issuers) using price data within a 500-day window (−250 to +250 trading days) surrounding the announcement date. Standard errors of the estimated coefficients are adjusted for autocorrelation and heteroscedasticity using the Newey and West (1987) method. Thus, we estimate 712 firm-specific time-series market models using GMM, which yields a firm-specific estimate of $\alpha_{0,s}$ and $\beta_{0,s}$ for each firm *s*.[10]

[10] We expanded the model in Eq. (1) by including three more variables to create a Multi-Factor Augmented Fama-French model where the three additional variables are Fama-French's Small Minus Big (SMB), Fama-French's High Minus Low (HML), and the Carhart momentum factor, Up Minus Down (UMD). SMB and HML are based on the

We also use the individual parameter estimates for $\alpha_{1,s}$ and $\beta_{1,s}$ for each firm from this model to calculate the averages of the changes in the model's alpha and beta parameters pre- and post-announcement. That is, the estimates for $\alpha_{1,s}$ and $\beta_{1,s}$ measure the change in an FI's alpha and beta, respectively, during the t−1 to t+250 day post-announcement period associated with the SEO disclosures. If market participants view the capital infusion as a negative signal of lower return or increased risk, the post-announcement level of alpha should be lower and the level of beta should be higher, on average. Alternatively, if market participants view the capital injection as a positive signal because the firm is either exploiting profitable growth opportunities or has become better capitalized, then alpha values would rise and/or beta values would decline in magnitude. In Table 2 of the following section, we conduct tests of the pre- and post-SEO differences in mean alphas and of mean betas across types of firms and issue (issuers vs. non-issuers for non-TARP and TARP issues).

To investigate the impact of the FIs' financial characteristics (proxied by *ROA*, *EquityToAssets*, *Divpay*, and *Size*) on investors' reactions to capital injections, we regress the estimated individual firms' alphas and betas after a capital infusion on these independent variables, as well as the relative size of the capital offering (*OfferToEquity*), a dummy variable to control for FIs that had more than one large SEO during 2000-2009 (*MultiSEO*), fixed effects variables that control for industry effects at the SIC code level, and two time-related dummy variables (*Recession01* and *Recession07*) that indicate whether the capital injection occurred

---

Fama-French value-weighted portfolios that are formed using size (market equity) and book-to-market value. SMB is the average return on the three portfolios of small firms minus the average return on the three portfolios of large firms. HML is the average return on the two portfolios of high book-to-market value firms minus the average return on the two portfolios of low book-to-market value firms. The momentum factor, Up minus Down (UMD), is based on the Fama-French value-weighted portfolios formed on size and prior returns and is the average return on the three high prior return portfolios minus the average return on the three low prior return portfolios. See http://mba.tuck.dartmouth.edu/ pages/faculty/ken.french/ Data_Library/f-f_factors.html. Estimating this alternative Fama-French model, we found alpha and beta estimates that are quite similar to those reported here for the simpler market model. To conserve space, we present the event study results in Table 1 for both models but focus mainly on the market model for the remainder of the analysis.

when the economy was in recession during 2001 or 2007-2009. This also allows us to investigate whether these impacts were dissimilar during these two recessionary periods.[11]

To investigate the factors that influence an FI's decision to raise capital, for each type of capital injection (private market SEO and TARP infusion) we estimate a probit model in which the binary dependent variable (y_s) equals 1 if the firm announces a large SEO, and zero for the matched non-issuing firms. The model's independent variables include both firm characteristics and the dummy variables noted above (rather than include fixed effects within a probit specification, we include a dummy variable, *bankdum*, set to one if the FI is a bank or thrift). In addition, to compare differences in the factors that influence issuing across type of issue, we estimate a probit model for the sample of issuers, where y_s equals 1 if the firm had a TARP infusion and 0 if the firm announced a private market SEO. Our estimated models based on a panel data set are described by Eqs. (2)-(4):

$$\begin{aligned}\alpha_s^* = {} & \phi_0 + \phi_1\ \mathrm{ROA}_s + \phi_2\ EquityToAssets_s + \phi_3\ Size_s + \phi_4\ DivPay_s + \phi_5\ Bankdum_s + \phi_6\ OfferToEquity_s \\ & + \phi_7\ Recession01_t + \phi_8\ \mathrm{Recession07}_t + \phi_9\ \mathrm{MultiSEO}_s + \Phi' FixedEffects + \varepsilon_s\end{aligned} \tag{2}$$

$$\begin{aligned}\beta_s^* = {} & \lambda_0 + \lambda_1\ \mathrm{ROA}_s + \lambda_2\ EquityToAssets_s + \lambda_3\ Size_s + \lambda_4\ DivPay_s + \lambda_5\ Bankdum_s \\ & + \lambda_6\ OfferToEquity_s + \lambda_7\ Recession01_t + \lambda_8\ \mathrm{Recession07}_t + \Lambda' FixedEffects + \omega_s\end{aligned} \tag{3}$$

$$\begin{aligned}\Pr(y_s = 1) = {} & \delta_0 + \delta_1\ \mathrm{ROA}_s + \delta_2\ EquityToAssets_s + \delta_3\ Size_s + \delta_4\ DivPay_s + \delta_5 Bankdum_s \\ & + \delta_6\ Recession01_t + \delta_7\ \mathrm{Re}cession07_t + \xi_s\end{aligned} \tag{4}$$

where,

α^*_s = post-announcement alpha estimate based on the results from Eq. (1)'s first-stage regression. It equals $\alpha_{0,s} + \alpha_{1,s}$ from Eq. (1),

β^*_s = post-announcement market beta estimate based on the results from Eq. (1)'s first-stage regression. It equals $\beta_{0,s} + \beta_{1,s}$,

[11] Since the financial crisis period over-lapped with the December 2007-June 2009 recession, we do not include a crisis-specific dummy variable. Thus, one can interpret the *Recession07* variable as capturing the effects of both the 2007-2009 recession and the financial crisis.

ROA_s = the *s*-th firm's accounting return on assets for the calendar year prior to the capital injection (defined as net income divided by average book value of assets),

$EquityToAssets_s$ = the *s*-th firm's measure of capital adequacy or leverage (defined as the book value of common equity divided by total assets for the calendar year prior to the capital injection),

$Size_s$ = the natural log of the *s*-th firm's year-end book value of assets for the calendar year prior to this capital issuance,

$DivPay_s$ = the *s*-th firm's dividend payout ratio (defined as total common dividends paid divided by net income in the calendar year prior to this capital issuance), to proxy for the firm's potential cash-flow constraints,

$Bankdum_s$ = a dummy variable equal to 1 if the *s*-th firm is a commercial bank or thrift institution, and zero otherwise,

$OfferToEquity_s$ = the *s*-th firm's measure of the relative size of the capital injection (defined as the dollar value of the capital injection divided by the firm's total shareholders equity for the calendar year prior to this capital issuance),[12]

$Recession01_t$ = a dummy variable equal to 1 if the capital injection occurred during March 2001 through November 2001 recession, and zero otherwise,

[12] Cornett and Tehranian (1994) suggest that the relative size of the offering might affect investor perceptions to the extent that larger offerings, relative to the FI's existing capital, may cause greater dilution of existing shareholders and could also signal a more severe adverse selection problem. We do not include this variable in the probit model because it is conditional on a firm's decision to inject capital.

$Recession07_t$	=	a dummy variable equal to 1 if the capital injection occurred during the December 2007 through June 2009 recession, and zero otherwise,
$MultiSEO_s$	=	a dummy variable equal to 1 if the FI issued more than one large SEO during the sample period, and zero otherwise,
ε_s, ω_s, ξ_s	=	zero-mean stochastic disturbance terms.

In Eqs. (2) – (4), we lag the firm-specific independent variables by one year to account for possible endogeneity and delayed effects. We also estimate the models in Eqs. (2) – (3) with industry fixed effects (dummy variables for the forty 4-digit SIC codes that represent sub-industries within the SIC financial services category).[13] We adjust the standard errors in the model for clustering by industry and year to account for any possible systematic variation in the model's variables due to the passage of time and to differences across industries.

By matching bank holding company data from the Y9-C report to our sample of SEOs, we are able to investigate the post-SEO financial performance of a key sub-sample of our FIs: bank holding companies. We proxy performance with six different measures related to lending activity and risk-taking behavior, measured over the year following the SEO, and we regress each of these variables on independent variables, including the value of the dependent variable in the year prior to the SEO, firm characteristics, capital injection characteristics, *Recession01*, *Recession07*, and *MultiSEO* dummy variables. Non-missing values of the variables allow us to include data on up to 104 issuers and 104 matched non-issuers. We lag the firm-specific independent variables by one year prior to the SEO to account for possible endogeneity and

[13] Additional tests based on our model without these fixed effects show qualitatively similar, albeit statistically weaker, results. Thus, to conserve space, we focus on the models that include the fixed effects

delayed effects, and we adjust the standard errors in the model for clustering by year.[14] Thus, our regressions are of the form:

$$Performance_{s,t+1} = \theta_0 + \theta_1\ Performance_{s,t-1} + \theta_2\ Firm\ Characteristics_{s,t-1} + \theta_3\ OfferToEquity_s + \theta_4\ Recession01_t + \phi_5\ \text{Recession07}_t + \phi_6 MultiSEO_s + \varepsilon_s \quad (5)$$

where the six performance measures (*Performance*) we examine are:

NLTA = total loans and leases, net of unearned income / total assets,

NPLTL = credit risk as measured by non-performing loans / total loans and leases, net of unearned income,

STNLTL = liquidity risk as measured by short-term non-core funding / total liabilities, where short-term non-core funding includes large time deposits with a maturity of one year or less, foreign deposits with a maturity of one year or less, federal funds purchased and securities sold under agreement to repurchase (RPs), commercial paper outstanding, borrowed money with a maturity of one year or less, and brokered deposits with a maturity of one year or less,

OBSATA = off-balance-sheet activities / total assets, where off-balance-sheet activities include the notional amount of financial standby letters of credit, performance standby letters of credit, commercial and similar letters of credit, risk participations in bankers' acceptances, securities lent, retained recourse on small business obligations, recourse and direct credit substitutes, all other financial assets sold with recourse, all other off-balance-sheet liabilities, unused commitments with a

[14] Because these firms are in the same industry (banking), we do not include industry-specific fixed effects.

maturity exceeding one year, and the credit equivalent amount of derivative contracts, as reported on Schedule HC-R of the Y9-C report,

FGTA = interest rate risk as measured by short-term assets minus short-term liabilities to total assets, where short-term assets are cash and balances due from depository institutions, available-for-sale securities, federal funds sold and securities purchased under agreement to resell (reverse RPs), and short-term liabilities are federal funds purchased and securities sold under agreement to repurchase (RPs), and

EquityToAssets = a measure of capital adequacy, as defined above.

The explanatory variables included in Eq. (5) are *ROA*, *Size*, *DivPay*, *EquityToAssets* (except when the performance measure is *EquityToAssets*), *Recession01*, *Recession07*, and *MultiSEO*, which are all defined above. In addition, we include the following FI-specific variables, which are likely to be associated with our performance-related dependent variables:

Cash = liquidity = cash + marketable securities / assets,

Opaq = opacity to external investors = goodwill + intangible assets / total assets,

Ohead = operational efficiency = total operating expenses / revenue,

Volume = access to capital markets as measured by equity trading volume (in shares),

TARPdum = a dummy variable equal to 1 if the FI received TARP funding or was matched to an FI that received TARP funding, and zero otherwise,

Targetdum = a dummy variable equal to 1 if the FI had an SEO issuance (either TARP or non-TARP), and zero otherwise,

TARPdum×Targetdum= 1 if the FI received TARP funding, and zero otherwise.

3. Empirical results

3.1. Immediate-term announcement effects of large capital infusions: Event study results

Estimates of Eq. (1) for non-TARP and TARP capital injections are reported in Table 1, panels A and B, respectively.[15] We find evidence that investors reacted negatively to the news of non-TARP SEOs, but positively to TARP injections. In the non-TARP issues, issuing firms' cumulative abnormal returns (CARs) are moderately negative (−56.6 bps) for the 2-day period corresponding to the announcement day and the subsequent day (t = 0 and t = +1) and are significant at the 10% level.[16] All other windows up to −10 to +10 days surrounding the event show insignificant effects for the issuing firms. In theory, there can be competitive and/or contagion effects from the SEOs on the non-issuing firms. Competitive effects would lead to abnormal returns for the non-issuing firms in the opposite direction to those on the issuing firms, while contagion effects would be in the same direction. Although such effects are observed in other studies, such as those performed by Slovin, et al. (1992, 1999), we find no significant CARs here for any of the windows for the non-issuer firms, except day t−1. This may have occurred either because of the lack of spillover effects or because the non-issuing firm sub-

[15] As noted earlier, in this table we report results for the Fama-French (including momentum factor) model as well as the market model, but because the results are similar, in the text we discuss the results from the market model to save space.

[16] We use the adjusted *t*-statistic method of Kolari and Pynnonen (2010) to account for increased variance and non-zero cross-correlation in a firm's returns around the time of the announcement due to potential time-clustering of events. This approach is shown to have greater statistical power compared to other tests when return variance and cross-correlations between firm's returns increase simultaneously due to many firms experiencing an event at, or near, the same event date.

sample includes firms with both competitive and contagion effects, resulting in a zero overall effect.[17]

We find that the market distinguishes between TARP and non-TARP issuances both in terms of direction and magnitude of the effects. Specifically, the CARs for the TARP injections for the issuing firms are positive, rather than negative, and they are larger in magnitude than for non-TARP injections, averaging +99.7 bps over the 2-day period (t = 0 and t = +1) versus −56.6 bps for non-TARP issues. Again, all other windows up to −10 to +10 days surrounding the event are found to be insignificant for the firms receiving TARP injections, except for the day before the injection (t−1), which is negative. For TARP events, the effect on the matched non-issuing firms is insignificant for all windows with two exceptions: the effect for the pre-announcement day is positive and the effect for the event day is negative. The conflicting effect between TARP-related issuing and non-issuing firms on the event day and the day before may be because news about an impending TARP injection leaked out, and it was initially perceived as indicating that the receiving firm was under stress. These results also indicate the presence of a competitive effect (rivalry), rather than a contagion effect, between the receiving firms and their non-issuing counterparts. The lack of significance of the effects beyond the second day after the event indicates that the impact of the announcements was short-lived and was absorbed by the market rather rapidly. In normal times, this is not surprising because equity markets tend to disseminate information quickly, being relatively efficient. However, we also find that during the period of TARP injections the market seems to be effective in quickly incorporating information. The

[17] Results based on the Fama-French model plus a momentum factor are generally consistent with those of the market model in terms of the direction and significance, though in some cases they are stronger in magnitude. Hence, our results are robust to the choice of different forms of the underlying return-generating process. There are two dissimilar findings, however, for issuers in the TARP injection cases. On day t−1 the effect is negative in the market model but insignificant in the Fama-French model, and on the event date, the effect is insignificant in the former and positive in the latter.

issuing firms' modestly negative immediate CARs and the positive effect from TARP funding reported in Table 1 suggest that investors react negatively to large private market capital infusions and positively to TARP capital injections. Thus, the reluctance of some FIs to take TARP funding seems to have been unfounded, at least in the near term over which we measure investor reactions. The findings based on the second-stage regressions that use the estimated post-announcement alphas and betas of issuing and non-issuing firms, reported in Table 3 and discussed in the next section, also support this conclusion.

As noted earlier, our results complement the findings of Gasparro and Pagano (2010), who report insignificant announcement effects for investment by sovereign wealth funds in 35 large North American FIs. These authors suggest that the lack of significance of such capital injections is due to their counterbalancing influences, including, e.g., lower leverage and better monitoring versus dilution and potentially negative signals. In addition, Norden, Roosenboom, and Wang (2011) find that recent government interventions in the U.S. banking sector can also positively influence the corporations that borrow from these banks. For example, they find that borrowing firms' stock returns were positively influenced by the TARP program, where the most pronounced effects are associated with smaller, riskier, and bank-dependent firms. Our results, taken together with the Gasparro-Pagano and Norden, et al. findings, indicate that the source of, and the economic environment surrounding, the SEO investment can be vitally important in determining the "net" announcement effect. That is, when large, patient investors with "deep pockets," such as the U.S. government or sovereign wealth funds, make a capital injection, the net effect can be positive for banks and their customers. However, when the investors in an SEO are unable to commit additional resources in the future, the net effect is negative.

3.2 Additional tests of the announcement effects

The summary statistics for the variables used in our regression analysis and the alpha and beta estimates based on the GMM estimation of the market model for the full sample of FIs (Eqs. (3) and (4)) are reported in Table 2, panels A and B. In addition, panels C-D and E-F display the summary statistics for the non-TARP and TARP events, respectively. Panel G compares characteristics of TARP issuers, private market SEO issuers, and all non-issuers (i.e., non-issuers matched with either a TARP issuer or a non-TARP issuer). These statistics reveal that:

(1) *The average alpha of the issuers was similar to that of non-issuers but it declined more sharply after the event.* The average values of risk-adjusted returns in the pre-event period, α_0, for the issuing and non-issuing firms reveal that prior to SEO announcements, the two groups had statistically similar risk-adjusted excess returns. In particular, prior to the announcements, the alphas for the full sample of 356 issuing FIs averaged −0.50 bps and those of the matching firms averaged 1.6 bps, and the difference between the two was statistically insignificant. But in the post-event period, the alphas are dissimilar. Specifically, in the year following the SEO announcement, the issuing firms' alpha was, on average, 7.2 bps lower compared to the period prior to the announcement, while the decline in the alpha for non-issuers was a much smaller 3.2 bps, and the difference between the two figures is significant at the 10% level. Examining panels C-D and E-F of Table 2, we see that this significant difference appears to be driven by TARP events. As shown in panel E, the alpha for TARP-related issuers decreased more sharply than for the full sample (−13.1 vs. −7.3 bps). The larger decline in alpha for the issuers compared to non-issuers stands in contrast to the mean-reversion view of competitive markets for financial services. This could indicate that our time period was too short for mean reversion to materialize or that the turmoil in financial markets over part of our sample period prevented mean reversion

from occurring. Also note, as shown in Panel G, TARP issuers had lower alphas than private market SEO issuers.

(2) *TARP issuers had greater market betas than non-issuers and private market SEO issuers, and the beta gap widened after the capitalization.* As shown in panels A and B in Table 2, the average beta values for issuers and non-issuers for the full sample are 0.80 and 0.72, respectively. The difference between these averages is not statistically significant for the full sample, but this full sample result masks the significant differences in the betas of the TARP issuers relative to non-issuers in Panels E and F (1.11 versus 0.86). This indicates that issuing firms under TARP were riskier prior to their capital injections, relative to their non-issuing matched firms. In other words, riskier firms chose to raise additional capital via TARP. For the full sample and for TARP issuers, the issuing firms also witnessed a greater increase in their systematic risk in the subsequent year, so that the gap between the two groups' betas widened in response to the SEO action. Specifically, for the full sample, the beta of issuing firms rose by 0.17 (a 21% increase), while the beta of non-issuers rose by 0.11, or 15% (the difference is statistically significant at the 5% level). This difference is economically significant. Using a 5% equity risk premium, the average increase of 0.17 in the issuing FI's beta translates into an 85-basis-point rise in the firm's cost of equity.

The rise in beta, again, appears to be driven by the TARP events: as shown in panels C and D, the average beta and change in beta values for issuing firms in non-TARP events were not significantly different from those of the non-issuers. As shown in panels E and F, the average beta for TARP issuers rose by 0.295 (+27%), while non-issuers' betas increased by 0.163 (+19%), with the difference between the two groups being significant at the 1% level. The dissimilar change in betas of the two groups indicates that investors distinguished between firms

that undertook capital injections and those that did not – TARP issuers were perceived as riskier than non-issuers in the post-event period. This may be because the TARP injections were not sufficient to solve the capital problems at the FI and/or that the FI chose to invest in risker projects after the injection. The fact that the beta of non-issuers also rose (although by less) indicates that there was indeed some risk spillover (or contagion) from the issuers to the non-issuers.[18,19] As reported in Panel G, TARP issuers were not only riskier than non-issuers, they were also riskier than firms that had announced private market capital infusions.

Note that the initial intention of the Emergency Economic Stabilization Act of 2008 (EESA), which created TARP, was to improve the safety of the banking system by injecting new capital and by curtailing excessive risk-taking driven by incentive-based executive compensation in banks receiving government funding. As a result of this program, a large number of FIs (both publicly and privately owned) received TARP funding, either voluntarily or involuntarily. The provisions of EESA designed to curb excessive incentive-driven risk-taking by bank CEOs include the discontinuation of tax deductibility for performance-based pay over $1 million, as well as the requirement of special committees to review any executive compensation policies that may contain unduly large risk-inducing provisions. Our results suggest that these provisions were not wholly successful or they were outweighed by the other incentives created by TARP funding, at least in the immediate post-injection period.

---

[18] It is possible that not only has the riskiness of the target and matching firms increased as a result of large capital infusions but also the riskiness of the market index itself. Our estimates are relative to the risk in the market.

[19] We also examined the distribution of the estimated changes in alpha and beta for the pooled sample of issuers and non-issuers. The distribution of the estimates of the change in alpha is skewed to the left, indicating that in the post-announcement period, a decline in risk-adjusted return is more frequent than an increase. The distribution of the estimates of the change in beta is skewed to the right, indicating that in the post-announcement period, a rise in beta is more frequent than a decrease. These results are consistent with those based on the mean of the distribution discussed in the text but are not included here in order to conserve space.

Recall that another objective of TARP (although an implicit one) was to increase bank lending through the infusion of government funds to ease tight credit market conditions. This objective had the potential to conflict with the other objectives of EESA by inducing banks to take on loans with higher credit risk than they would have otherwise made. Our result, discussed below and reported in Table 5, that TARP recipients and their matched non-issuers had higher credit risk in the year after the TARP injection, compared to a year before, is consistent with this potential conflict. Our finding that TARP funding is associated with higher credit risk is broadly consistent with the main findings of Black and Hazelwood (2010), who focus on the narrower topic of the effects of TARP funding on just the credit risk-taking behavior of the recipients and find that among the banks that received TARP injections, large banks increased their credit risk, while smaller banks lowered their credit risk (relative to peers that did not receive TARP financing).

(3) *Other differences and similarities in firm characteristics*. According to the difference-in-means tests for the full sample, reported in Table 2, Panels A and B, the issuer firms are similar to non-issuers in terms of size (total assets and total market value of equity), ROE, operational efficiency (overhead expenses to revenue), and liquidity (cash plus marketable securities-to-total assets). Relative to non-issuers, on average, issuing FIs had statistically significantly lower equity-to-assets (9.5% compared to 11.8% for non-issuers) and lower firm-wide profitability in terms of ROA (0.72% versus 1.06%). Also, the sub-sample of non-TARP issuers has a lower dividend payout ratio (19.2% compared to 29.2% for non-issuers), suggesting that these issuers were not only less profitable and more highly levered but also more cash-flow-constrained than non-issuers. All three of these factors can serve as driving forces behind the capitalization decision, examined in the next section. Panel G's univariate comparison indicates

that among firms issuing capital, those who received TARP injections were larger, less cash-flow constrained, less profitable, less liquid, and less efficient, and the relative size of TARP injections tended to be smaller than other capital issuances.

***3.3 Investor reactions to capital infusions (panel-based tests*)**

Table 3 presents the results of the panel regressions of the individual firms' alphas and betas as specified in Eqs. (2) and (3).[20] Results in Panels A and B indicate that in non-TARP issuances, excess return performance (as measured by alpha) is greater for less profitable firms (ROA) and when the economy is in recession (including the recent financial crisis). At first blush, this may seem counterintuitive; however, we are measuring performance relative to the market as a whole: firms able to issue new capital during a recession are relatively better off than other firms and, thus, their post-SEO performance is likely to be stronger than that of other market participants who are not able to raise capital during a weak economy. For TARP-related FIs (both issuers and non-issuers), alpha is greater for smaller firms.

Post-SEO announcement systematic risk (as measured by beta) for non-TARP events is higher for firms that are more profitable (ROA), more highly capitalized, and larger. Beta values are also lower for larger equity issues (*OfferToEquity*) and when the issuance occurred during the 2001 recession. It could be that more profitable, larger, and more highly capitalized firms are more willing and more capable of absorbing risk. One explanation for the issue-size effect may be that FIs with lower betas can issue larger amounts of equity, i.e., there is reverse causality: it could be that lower-beta firms are more likely to attract larger amounts of capital from risk-

[20] Based on the earlier results in Table 2 that show significant differences across sub-samples of the data set, we focus on this four-way split of the data (TARP vs. non-TARP and issuer vs. non-issuer) here. In addition, we estimated the models in this section using a pooled sample rather than using this 4-way split and found that the parameter estimates and explanatory power of our models were significantly greater when we based the estimation on the sub-samples rather than the pooled data set. Thus, to conserve space, we focus on the sub-sample results throughout the rest of the paper.

averse investors instead of it being that large issues lead to lower post-event risk (and, therefore, lower betas). For the non-issuing firms, too, firm size and profitability both have positive effects on beta (along with the recession coinciding with the crisis), while the 2001 recession and increased dividend payments (signifying a lower cash-flow constraint) are negatively associated with it. Similar to non-TARP issues, the beta of TARP-related FIs is higher for larger financial firms.[21] The relationship we find between size and beta for both non-TARP and TARP issuers, as well as non-issuers, is consistent with that of Berger, Demsetz, and Strahan (1999), who report that larger depository FIs typically have greater incentives to take on risk but are also more exposed to economy-wide systemic risk and, thus, are likely to assume greater systematic risk. Elyasiani, Mansur, and Pagano (2007) argue that the greater systematic risk of the larger banks may be due to their assumption of greater credit risk, higher financial leverage, more extensive engagement in off-balance-sheet activities, and the more aggressive attitudes of their managers toward risk.

3.4 Probit analysis of the decision to raise additional capital

Table 4 reports the estimation results for the probit models of the decision to raise capital. As shown in Panels A and B, we find that non-TARP FIs with tighter financial constraints (i.e., lower *divpay*) were more likely to seek a large capital investment while TARP injections were more likely when FIs were more leveraged (lower equity to assets ratio).

[21] We checked to see if the original set of TARP injections to 9 major FIs (as reported in the *Wall Street Journal* on October 14, 2008) had a significant impact on our results by including a dummy variable equal to 1 for these specific SEO events in October 2008. For both our alpha and beta second-stage regressions, this additional dummy variable is insignificant and does not alter the rest of our model's key findings, although the results are not reported here to conserve space. Thus, it does not seem to matter to investors whether the SEO event was a "forced" TARP infusion or a "necessary" TARP investment. It should also be noted that we include in our second-stage regressions the FI's dividend payout ratio (*divpay*), which proxies for an FI's cash-flow constraints and thus is another way to control indirectly for the possibility that a TARP infusion might have been forced upon an FI.

Panel C compares the likelihood of receiving a TARP injection relative to the likelihood of receiving a private market injection, among all issuers. Here, we see that TARP funding was more likely than non-TARP funding for banks and thrifts, as well as for FIs with looser financial constraints. We also find in Panel D that TARP issuers tended to have higher leverage than non-issuers, all else equal.

3.5 Post-SEO performance

Table 5 reports the estimation results for the performance regressions described in Eq. (5) based on our sample of bank issuers and their matched non-issuing firms. All six dependent variables are found to be strongly influenced by their lagged values, indicating that they adjust slowly to innovations and that their changes are path dependent. As shown in column 1, we find evidence that issuers did raise their level of lending activity (as a ratio of assets) after a capital injection, with TARP and non-TARP injections displaying similar effects. This indicates that either form of capital injection is conducive to increased credit availability to borrowers and has the potential to ease credit crunches. The significant coefficients on the *TARPdum* variable in columns 2-3 indicate that credit risk rose, while liquidity risk fell, after TARP injections.[22] This may indicate that the new loans made by FIs that received TARP injections are risker than those they made previously. The *Recession01* dummy is found to exert an influence only on liquidity risk, capital and interest rate risk with the forming two measures being affected negatively and the latter positively. In contrast, the significant coefficient on *Recession07* in columns 1-3 and 5 indicate that, after controlling for TARP effects, lending activity, liquidity risk and off-balance-sheet risk all rose, while the ratio of non-performing loans to total loans and leases decreased

[22] The increase in lending and risk is similar to a finding in Deng, Elyasiani, and Mao (2010) that banks use derivatives to hedge marketable interest rate risk in order to increase their lending.

after capital issues during this recessionary/crisis period. Thus, FIs with non-TARP capital injections that occurred during the 2007-2009 recession appear to have behaved differently during the post-SEO period by decreasing credit risk, while increasing liquidity and off-balance-sheet risks (risk substitution). In addition, after controlling for the *Recession07* and other relevant factors, we find no significant change in capital adequacy after TARP injections. Taken together, our results suggest that the TARP may have enabled recipients to increase lending, and therefore, credit risk, but these banks funded more of these loans with traditional core deposits and, therefore, their liquidity risk was lower (compared to FIs with non-TARP injections during this period). Thus, the new capital was not used to boost capital adequacy.

4. Conclusion

This study investigates investors' reactions over the immediate and longer term horizons to the announcement of seasoned equity offerings (SEOs) by financial institutions through private market transactions and TARP funding. In particular, we examine how these reactions vary with characteristics of the firms, and phases of the business cycle. In addition, we provide evidence on the determinants of the FIs' decisions to issue additional equity capital, as well as the post-SEO financial performance of issuing firms and a matched sample of non-issuing firms.

We find that: (1) Investors reacted negatively to the news of capital injections through private (non-TARP) funding both in the immediate term (i.e., the two days surrounding the announcement) and over the subsequent year, but positively for TARP injections. The positive reaction to TARP funding might signal that investors took such funding as an indication that the receiving firms would be treated as "too-big-to-fail," or that the funding would make them less likely to fail relative to firms that did not receive such funding. Thus, the reluctance of some firms to take such funding seems to have been unfounded, at least in the near term over which

we measure investor reactions. It remains to be seen whether the longer-term effects are positive. For the year following the capital injection, systematic risk, as measured by a firm's beta, rose significantly, and we estimate that a typical FI's cost of equity capital rose by 85 bps during the post-SEO period. We also find that banking-related firms were less likely to raise capital through non-TARP SEOs in our 2000-2009 sample period. This reluctance may have made these types of firms more vulnerable when the financial crisis hit, thus potentially prompting the need for the TARP program.

(2) Investor reactions to capital injection news are significantly related to the FIs' prior financial condition, including profitability, capitalization, and size. For non-TARP injections, the post-announcement systematic risk for issuers is higher for larger, more profitable, and better capitalized issuers.

(3) Investor reactions to capital infusions vary with the stage of the business cycle, as well as whether or not the SEO occurred during the recent 2007-2009 recession/crisis. For example, equity offerings by FIs during this recent recessionary/crisis period were followed by significantly higher systematic risk for TARP infusions. In addition, the risk-adjusted excess returns for TARP recipients were significantly lower after receiving the TARP funds.

(4) Several firm-specific and economy-wide factors are among the determinants of a firm's decision to issue new capital. These factors include the FIs' cash-flow constraints, with greater constraints prompting more non-TARP SEOs. For TARP injections, financial leverage plays a significant role, as firms receiving TARP funding were more leveraged (i.e., low on capital), all else equal.

(5) After TARP injections, credit risk increased while liquidity risk decreased. We also find evidence that FIs increased their lending as a share of assets after both TARP and other SEO

injections. Thus, our results suggest that TARP may have enabled banks to increase lending by extending loans to riskier borrowers and by funding these loans with more traditional bank core deposits, thus, raising a FI's credit risk but lowering its liquidity risk and easing credit crunch conditions.

Overall, our analysis suggests that capital infusions in financial institutions can lead to varying investor reactions, even after controlling for firm-specific factors, due to the source of the funding (e.g., private vs. government), as well as changes in market-wide conditions related to business cycles. In addition, our initial evidence on how these capital infusions affect post-SEO financial performance suggests that TARP-related deals do not affect capital adequacy but are associated with increased lending and altered bank risk-taking behavior. However, future research will be required to assess the long-term effects of these capital infusions on FI performance.

Figure 1. Distribution of SEOs by Year

This graph displays the number of seasoned equity offerings (SEOs) issued each year during the sample period 2000 - 2009.

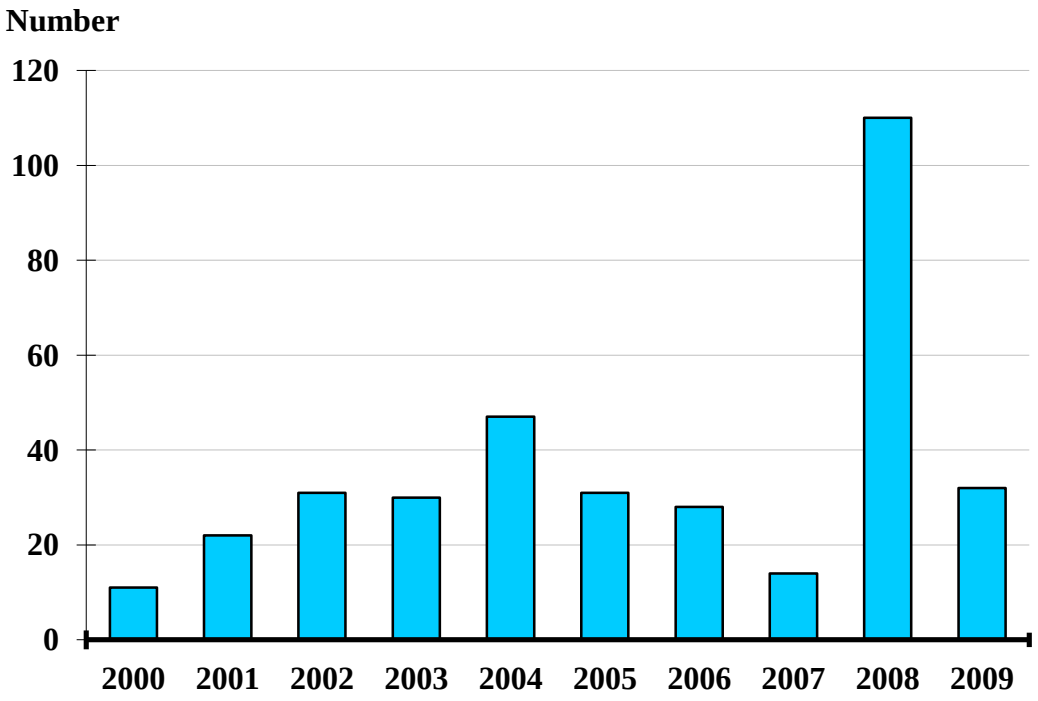

Figure 2. Distribution of SEOs by Industry

This graph displays the number of seasoned equity offerings (SEOs) by various types of financial institutions, as defined by SIC industry codes 6000 to 6799.

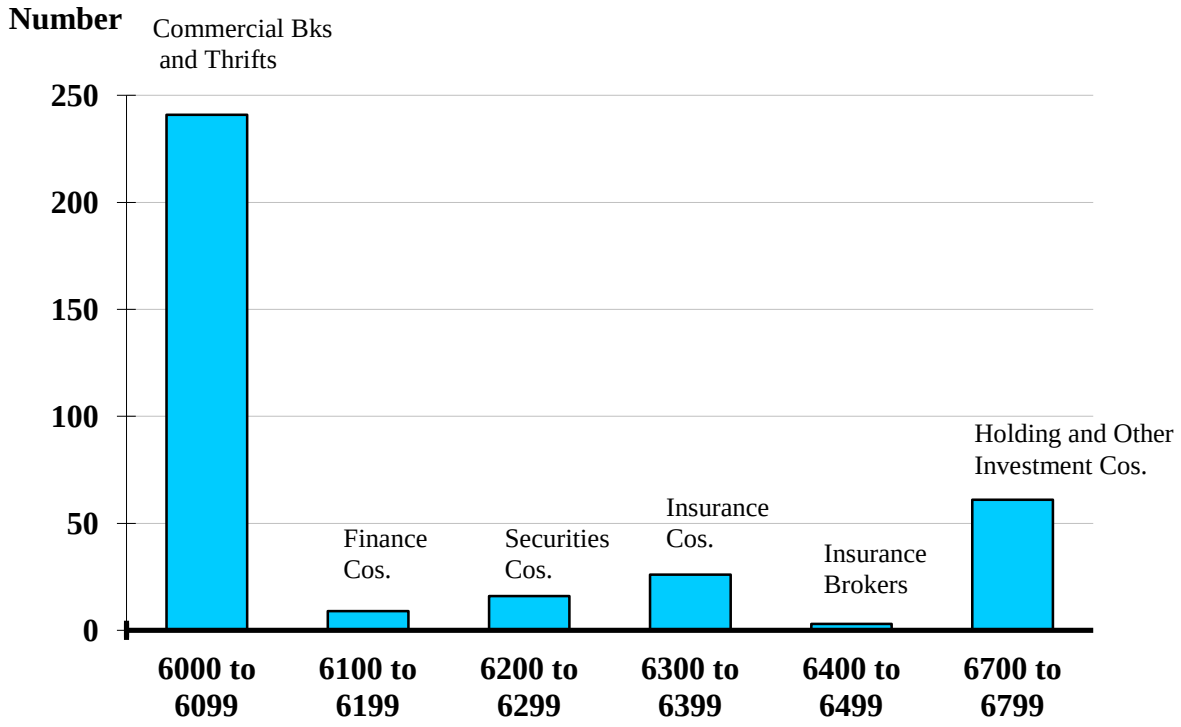

Table 1. Cumulative Abnormal Returns (CARs)

These CAR estimates for non-TARP and TARP events are based on the Markowitz (1952) model, Eq. (1), and a model based on the Fama-French factors plus a momentum factor (*F-F + Momentum*) for various time windows. All models are estimated via generalized method of moments (GMM). We use the adjusted *t*-statistic method of Kolari and Pynnonen (2010) to account for increased variance and non-zero cross-correlation in a firm's returns due to potential time-clustering of events.

Panel A. Non-TARP Issuances

	Issuing Firms		Non-Issuing Firms	
Window	Market Model	F-F + Momentum	Market Model	F-F + Momentum
−1	0.00039	0.00031	**−0.00158***	**−0.00155***
0	−0.00244	−0.00268	0.00098	0.00096
−1, 0	−0.00205	−0.00237	−0.00060	−0.00059
0, +1	**−0.00566***	**−0.00598***	0.00146	0.00144
−1, +1	−0.00562	−0.00598	−0.00012	−0.00011
−5, +5	−0.00664	−0.00730	−0.00263	−0.00332
−10, +10	−0.00421	−0.00600	0.00121	0.00069

*Significant at the 10% level and **significant at the 5% level, based on standard errors adjusted for autocorrelation and heteroscedasticity using the Newey and West (1987) method.

Panel B. TARP Injections

	Issuing Firms		Non-Issuing Firms	
Window	Market Model	F-F + Momentum	Market Model	F-F + Momentum
−1	**−0.00827***	−0.00649	**0.00892****	**0.01000****
0	0.00569	**0.00676***	**−0.00830****	**−0.00749****
−1, 0	−0.00258	0.00027	0.00062	0.00251
0, +1	**0.00997***	**0.01233****	−0.00736	−0.00536
−1, +1	0.00170	0.00584	0.00156	0.00464
−5, +5	−0.00006	0.01750	−0.02111	−0.01021
−10, +10	0.00487	0.02510	−0.02580	0.00230

*Significant at the 10% level and **significant at the 5% level, based on standard errors adjusted for autocorrelation and heteroscedasticity using the Newey and West (1987) method.

Table 2. Descriptive Statistics and Difference-in-Means Tests

This table reports the summary statistics for the main variables used in the empirical tests and some additional firm characteristics. The first four variables reported below are used in the time series regressions described by Eq. (1), while the other variables are used in the cross-sectional analyses described by Eqs. (2)-(5) and reported in Tables 3-5. Panel A displays statistics for firms that issue a large amount of equity capital (*Issuing Firms*), while Panel B shows similar statistics for *Non-issuing Firms*. In Panel A, we report the results of difference-in-means tests by comparing the *Issuing Firms'* average values to the *Non-issuing Firms'* averages. Statistically significant differences between the values in the two panels are denoted at various confidence levels as follows: * 10%, ** 5%, and *** 1%.

		Panel A. All Issuing Firms			**Panel B. All Non-issuing Firms**		
Variable	Description	Mean	Std. Dev.	No. obs.	Mean	Std. Dev.	No. obs.
	Variables used in event study						
α_0, Alpha	Eq. (1) constant	−0.00005	0.00210	356	0.00016	0.00198	356
α_1	Change in alpha	−0.00072 *	0.00299	356	−0.00032 *	0.00289	356
β_0, Beta	Eq. (1) slope	0.80413	0.73562	356	0.72228	0.68892	356
β_1	Change in beta	0.16980 **	0.42067	356	0.10902 **	0.40526	356
Adj. R−squared	For Eq. (1) regressions	0.15266 *	0.17439	356	0.17574 *	0.19731	356
	Variables used in Eqs. (2)-(5) (one-year lagged values)						
ROA	Return on assets	0.00719 **	0.01692	356	0.01060 **	0.01957	356
EquityToAssets	Equity / assets	0.09539 ***	0.05965	356	0.11772 ***	0.08248	356
Divpay	Dividend payout ratio	0.27378	0.61233	356	0.32778	0.37481	356
Size	Log of total assets	7.56136	1.63670	356	7.55146	1.91856	356
OfferToEquity	SEO amount / equity	39.62079	39.41973	356	0.00000	0.00000	356
Recession01	2001 Cycle Dummy	0.05899	0.23594	356	0.05899	0.23594	356
Recession07	07-09 Cycle Dummy	0.38202	0.48657	356	0.38202	0.48657	356
Bankdum	Bank/thrift dummy	0.78933	0.40836	356	0.78371	0.41230	356
MultiSEO	Multiple Issuer	0.25000	0.43362	356	0.00000	0.00000	356
ROE	Return on equity	0.07334	0.23020	351	0.10240	0.29383	342
Cash	Cash + marketable securities / assets	0.06634	0.11312	356	0.05766	0.07049	356
Common Equity	Book value of equity	1137.05698 **	3359.77289	346	2091.55821 **	8238.06823	354
Opaq	Goodwill+intangibles / assets	0.04129	0.11007	334	0.03370	0.09723	333
Mcap	Log of market value of equity	5.474664	1.79419	350	5.52420	1.88159	326
Ohead	Total operating expenses / revenue	0.70640	0.29108	352	0.68685	0.23336	356
Volume	Trading volume (shares)	104,456,499.0	349,699,407.3	356	94,068,131.0	338,270,219.0	356

Table 2. Descriptive Statistics and Difference-in-Means Tests (continued)

		Panel C. Non-TARP Issuing Firms			Panel D. Non-TARP Non-issuing Firms		
Variable	Description	Mean	Std. Dev.	No. obs.	Mean	Std. Dev.	No. obs.
	Variables used in event study						
α_0, Alpha	Eq. (1) constant	0.00055	0.00155	231	0.00051	0.00149	231
α_1	Change in alpha	−0.00040	0.00221	231	−0.00009	0.00203	231
β_0, Beta	Eq. (1) slope	0.63655	0.57897	231	0.64582	0.62493	231
β_1	Change in beta	0.10198	0.38309	231	0.07992	0.40408	231
Adj. R-squared	For Eq. (1) regressions	0.11520 *	0.14382	231	0.14358 *	0.16808	231
	Variables used in Eqs. (2)-(5) (one-year lagged values)						
ROA	Return on assets	0.00740 **	0.02031	231	0.01088 **	0.01730	231
EquityToAssets	Equity / assets	0.09581 ***	0.05774	231	0.10983 ***	0.05886	231
Divpay	Dividend payout ratio	0.19180 ***	0.34771	231	0.29922 ***	0.36085	231
Size	Log of total assets	7.38769	1.62685	231	7.50796	1.96181	231
OfferToEquity	SEO amount / equity	46.10390	47.17256	231	0.00000	0.00000	231
Recession01	2001 cycle dummy	0.09091	0.28810	231	0.09091	0.28810	231
Recession07	07-09 Cycle Dummy	0.07792	0.26863	231	0.07792	0.26863	231
MultiSEO	Multiple Issuer	0.29870	0.45868	231	0.00000	0.00000	231
Bankdum	Bank/thrift dummy	0.70130	0.45868	231	0.69264	0.46240	231
ROE	Return on equity	0.08023	0.25614	231	0.11919	0.34471	231
Cash	Cash + marketable securities / assets	0.07763 *	0.12054	231	0.06177 *	0.07797	231
Common Equity	Book value of equity	961.27576 **	2529.03378	231	1773.537 **	5675.18364	231
Opaq	Goodwill+intangibles / assets	0.03973 *	0.13444	213	0.02202 *	0.04544	211
Mcap	Log of market value of equity	5.45306	1.83716	231	5.65808	2.05008	224
Ohead	Total operating expenses / revenue	0.68379	0.34894	228	0.66739	0.27055	231
Volume	Trading volume (shares)	69,855,307.3	160,726,382.7	231	93,337,992.1	342,645,295.6	231

Table 2. Descriptive Statistics and Difference-in-Means Tests (continued)

		Panel E. TARP Issuing Firms			Panel F. TARP Non-issuing Firms		
Variable	Description	Mean	Std. Dev.	No. obs.	Mean	Std. Dev.	No. obs.
	Variables used in event study						
α_0, Alpha	Eq. (1) constant	−0.00116 **	0.00251	125	−0.00050 **	0.00254	125
α_1	Change in alpha	−0.00131	0.00401	125	−0.00073	0.00401	125
β_0, Beta	Eq. (1) slope	1.11383 **	0.88231	125	0.86358 **	0.77677	125
β_1	Change in beta	0.29514 **	0.45826	125	0.16279 **	0.40353	125
Adj. R-squared	For Eq. (1) regressions	0.22187	0.20312	125	0.23519	0.23144	125
	Variables used in Eqs. (2)-(5) (one-year lagged values)						
ROA	Return on assets	0.00680	0.00735	125	0.01007	0.02326	125
EquityToAssets	Equity / assets	0.09463 ***	0.06327	125	0.13229 ***	0.11279	125
Divpay	Dividend payout ratio	0.42528	0.90195	125	0.38056	0.39541	125
Size	Log of total assets	7.88231	1.61244	125	7.63184	1.84097	125
OfferToEquity	SEO amount / equity	27.64000	9.91122	125	0.00000	0.00000	125
Recession01	2001 cycle dummy	0.00000	0.00000	125	0.00000	0.00000	125
Recession07	07-09 Cycle Dummy	0.94400	0.23085	125	0.94400	0.23085	125
MultiSEO	Multiple Issuer	0.16000	0.16000	125	0.00000	0.00000	125
Bankdum	Bank/thrift dummy	0.95200	0.21463	125	0.95200	0.21463	125
ROE	Return on equity	0.06008	0.16964	120	0.06748	0.13179	111
Cash	Cash + marketable securities / assets	0.04548	0.09490	125	0.05008	0.05348	125
Common Equity	Book value of equity	1490.14797	4590.06140	115	2688.81678	11623.04241	123
Opaq	Goodwill+intangibles / assets	0.04404	0.04095	121	0.05391	0.14734	122
Mcap	Log of market value of equity	5.51659	1.71451	119	5.23018	1.40915	102
Ohead	Total operating expenses / revenue	0.74797	0.11991	124	0.72280	0.13465	125
Volume	Trading volume (shares)	168,399,501.2	543,907,607.7	125	95,417,427.7	331,392,573.4	125

Table 2. Descriptive Statistics and Difference-in-Means Tests (continued)

Panel G: Comparison of TARP Issuing Firms, Non-TARP Issuing Firms, and All Non-Issuing Firms

Variable	Description	TARP Issuing Firms Mean	Non-TARP Issuing Firms Mean	All Non-Issuing Firms Mean
	Variables used in event study			
α_0, Alpha	Eq. (1) constant	−0.00116 †††,‡‡‡	0.00055 †††	0.00016 ‡‡‡
α_1	Change in alpha	−0.00131 ††,‡‡	−0.00040 ††	−0.00032 ‡‡
β_0, Beta	Eq. (1) slope	1.11383 †††,‡‡‡	0.63655 †††	0.72228 ‡‡‡
β_1	Change in beta	0.29514 †††,‡‡‡	0.10198 †††	0.10902 ‡‡‡
Adj. R-squared	For Eq. (1) regressions	0.22187 †††,‡‡	0.1152 †††	0.17574 ‡‡
	Variables used in Eqs. (2)-(5) (one-year lagged values)			
ROA	Return on assets	0.00680 ‡‡‡	0.00740	0.0106 ‡‡‡
EquityToAssets	Equity / assets	0.09463 ‡‡‡	0.09581	0.11772 ‡‡‡
Divpay	Dividend payout ratio	0.42528 †††	0.19180 †††	0.32778
Size	Log of total assets	7.88231 †††,‡	7.38769 †††	7.55146 ‡
OfferToEquity	SEO amount / equity	27.64000 †††	46.10390 †††	0.00000
Recession01	2001 cycle dummy	0.00000	0.09091	0.05899
Recession07	07-09 Cycle Dummy	0.94400 †††,‡‡‡	0.07792 †††	0.38202 ‡‡‡
MultiSEO	Multiple Issuer	0.16000 †††	0.29870 †††	0.00000
Bankdum	Bank/thrift dummy	0.95200 †††,‡‡‡	0.70130 †††	0.78933 ‡‡‡
ROE	Return on equity	0.06008 ‡	0.08023	0.10240 ‡
Cash	Cash + marketable securities / assets	0.04548 †††	0.07763 †††	0.05766
Common Equity	Book value of equity	1490.148	961.276	2091.558
Opaq	Goodwill+intangibles / assets	0.04404	0.03973	0.0337
Mcap	Log of market value of equity	5.51659	5.45306	5.52420
Ohead	Total operating expenses / revenue	0.74797 ††,‡‡‡	0.68379 ††	0.68685 ‡‡‡
Volume	Trading volume (shares)	168,399,501.2 ††	69,855,307.3 ††	94,068,131.0

† TARP Issuing Firms significantly different from Non-TARP Issuing Firms at the 10% level
†† TARP Issuing Firms significantly different from Non-TARP Issuing Firms at the 5% level
††† TARP Issuing Firms significantly different from Non-TARP Issuing Firms at the 1% level

‡ TARP Issuing Firms significantly different from All Non-Issuing Firms at the 10% level
‡‡ TARP Issuing Firms significantly different from All Non-Issuing Firms at the 5% level
‡‡‡ TARP Issuing Firms significantly different from All Non-Issuing Firms at the 1% level

Table 3. Second-Stage Panel Regression Analysis Based on Capital Issuance

Eqs. (2) and (3) panel regressions for firms issuing large capital offerings (10% or more of existing common equity) and matched firms that did not issue equity. Standard errors are clustered by both year and SIC industry code. Statistically significant differences are denoted at various confidence levels as follows: * 10%, ** 5%, and *** 1%.

	Panel A. Non-TARP events: Issuers				**Panel B. Non-TARP events: Non-Issuers**			
Dependent Var.	**α***		**β***		**α***		**β***	
Independent Var.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.
Intercept	0.000715	0.62	–0.83936***	–3.24	–0.00015	–0.22	–0.117	–0.31
ROA	–0.01007*	–1.88	3.28999**	2.61	0.002462	0.45	2.574744**	2.81
EquityToAssets	–0.00025	–0.08	1.881284**	2.83	0.001487	0.86	–0.53366	–0.49
OfferToEquity	–1.4E-06	–0.50	–0.00117***	–2.98				
Size	–9.9E-05	–0.66	0.222606***	6.93	–4.8E-05	–0.50	0.172412***	5.05
Divpay	–0.0002	–0.37	–0.07762	–0.72	0.00034	0.99	–0.21121*	–1.77
Recession01	0.000691*	1.96	–0.18185***	–70.42	0.000419*	1.81	–0.18952***	–3.03
Recession07	0.001935***	4.14	0.164192	1.40	0.001999***	4.68	0.286012***	3.53
MultiSEO	0.000147	0.65	–0.04312	–0.83				
Fixed Effects?	Yes		Yes		Yes		Yes	
No. Obs.	231		231		231		231	
Adjusted R^2	0.1374		0.6034		0.06877		0.4671	

	Panel C. TARP events: Issuers				**Panel D. TARP events: Non-Issuers**			
Dependent Var.	**α***		**β***		**α***		**β***	
Independent Var.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.
Intercept	0.010222***	7.42	–3.513917***	-14.29	0.007951***	4.97	–1.27984	–1.28
ROA	0.0037031	0.06	–10.003816	-0.72	0.012709	0.31	–19.8671*	–1.92
EquityToAssets	0.0001101	0.04	0.599402	1.31	–0.00777***	–12.96	1.840213*	2.04
OfferToEquity	0.0000275	1.14	–0.001565	-0.19				
Size	–0.00062***	–8.92	0.417377***	36.98	–0.0007***	–24.11	0.345858***	3.07
Divpay	0.0000773	0.30	–0.028298	-0.38	0.000293	0.25	0.155721	0.81
Recession01								
Recession07	–0.00279***	–4.05	0.435970*	2.02	–0.00056	-0.44	–0.0403	–0.24
MultiSEO	0.0003250	0.71	–0.055896	-0.54				
Fixed Effects?	Yes		Yes		Yes		Yes	
No. Obs.	125		125		125		125	
Adjusted R^2	0.2483		0.5182		0.1229		0.4295	

Table 4. Probit Model of the Likelihood That a Firm Receives a Large Capital Infusion

Results of probit model Eq. (4) where the dependent variable is equal to 1 if the firm issued a large SEO (i.e., a seasoned equity offering totaling 10% or more of the firm's prior year's common equity). Panel A reports the results for private market issues and Panel B reports the results for TARP infusions, where the comparison group is matched non-issuers. Panel C reports the results for TARP infusions, where the comparison group is non-TARP issuer and Panel D reports the results for TARP infusions, where the comparison group is all non-issuers. All independent variables are described in Table 2. Statistically significant parameter estimates are denoted at various confidence levels as follows: * 10%, ** 5%, and *** 1%.

	Panel A. Non-TARP Issues				**Panel B. TARP Infusions**			
Parameter	Estimate	S.E.	Chi Square	p-value	Estimate	S.E.	Chi Square	p-value
Intercept	0.6582	0.4963	1.76	0.1848	0.5141	0.7944	0.42	0.5175
ROA	–0.8014	3.6059	0.05	0.8241	–0.9374	7.8650	0.01	0.9051
EquityToAssets	–1.8817	1.3433	1.96	0.1613	–3.1345***	1.2173	6.63	0.0100
Size	–0.0520	0.0435	1.43	0.2318	0.0083	0.0508	0.03	0.8697
Divpay	–0.4870***	0.1886	6.67	0.0098	0.1022	0.1376	0.55	0.4574
Bankdum	–0.2444	0.1943	1.58	0.2084	–0.4531	0.4788	0.90	0.3440
Recession01	–0.0969	0.2395	0.16	0.6859	0.0000			
Recession07	0.1782	0.2392	0.55	0.4563	0.0667	0.3599	0.03	0.8529
MultiSEO	7.1295	9194.9	0.00	0.9994	6.7719	10412.07	0.00	0.9995
No. obs.	462				250			

	Panel C. TARP Infusions conditional on Issuing				**Panel D. TARP Infusions compared to Not Issuing**			
Parameter	Estimate	S.E.	Chi Square	p-value	Estimate	S.E.	Chi Square	p-value
Intercept	–3.6373***	0.8848	16.90	< 0.0001	–2.0599***	0.5490	14.08	0.0002
ROA	0.9379	12.463	0.01	0.9400	–0.0262	5.4997	0.00	0.9962
EquityToAssets	3.4387	3.3521	1.05	0.3050	–2.7279**	1.1818	5.33	0.0210
Size	–0.0159	0.0784	0.04	0.8392	0.0090	0.0450	0.04	0.8423
Divpay	0.9829***	0.2993	10.79	0.0010	0.1185	0.1368	0.75	0.3864
Bankdum	1.5031***	0.3757	16.00	< 0.0001	0.3972	0.3137	1.60	0.2055
Recession01	–5.2305	15682.1	0.00	0.9997	–4.9986	16500.4	0.00	0.9998
Recession07	3.1089***	0.2684	134.1	< 0.0001	1.6802***	0.2041	67.79	< 0.0001
MultiSEO	0.0868	0.3055	0.08	0.7763	8.2151	16677.3	0.00	0.9996
No. obs.	356				481			

Table 5. Post-SEO Financial Performance of Bank Issuers and Their Matched Non-issuer Firms

Panel regressions for a pooled data set of issuing and non-issuing firms, where post-SEO financial performance is proxied by the bank's lending activity (NLTA), credit risk (NPLTLL), liquidity risk (STNLTL), capital adequacy (EquityToAssets), off-balance-sheet activities (OBSATA), and interest rate risk (FGTA). Each dependent variable measures the level of the relevant performance metric for the year following the SEO issuance. The independent variables measuring bank characteristics are measured for the year prior to the SEO. *Lagged Dep. Var*. represents the dependent variable's value for the year prior to the SEO issuance. *TARPdum* is a dummy variable set to 1 if the FI received TARP funding or was matched to an FI that received such funding. *Targetdum* is a dummy variable set to 1 if the FI had an SEO issuance (i.e., either a TARP or non-TARP capital infusion). *Targetdum×TARPdum* is an interaction term that isolates the effects on TARP issuers within the sample. Year-clustered standard errors are used to evaluate statistical significance at the * 10%, ** 5%, and *** 1% levels.

	(1)		(2)		(3)		(4)		(5)		(6)	
Dependent Var.	**Lending Activity (NLTA)**		**Credit Risk (NPLTLL)**		**Liquidity Risk (STNLTL)**		**Capital Adequacy (EquityToAssets)**		**Off-Balance-Sheet Risk (OBSATA)**		**Interest Rate Risk (FGTA)**	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Independent Var.												
Intercept	0.0866**	0.0400	–0.006889	0.2515	0.002059	0.9488	0.01903**	0.0138	–0.01665**	0.0101	0.0125295	0.5507
Lagged Dep. Var.	0.9387***	<0.0001	1.0276***	<0.0001	0.933***	<0.0001	0.9013***	<.0001	0.8443***	<0.0001	0.788***	<0.0001
TARPdum	–0.006006	0.1641	0.0056***	0.0020	–0.0198**	0.0327	–0.003344	0.1624	0.0020311	0.3476	0.0042373	0.3725
Targetdum	0.008026*	0.0853	0.0009448	0.6390	–0.008977	0.3295	0.0010864	0.7223	–0.0004499	0.9204	0.0050608	0.4213
(TARPdum× Targetdum)	0.0027131	0.6406	–0.001629	0.2877	0.014082	0.1508	0.0033101	0.4774	0.0015645	0.6244	–0.0095383	0.1205
Recession01	–0.007352	0.3458	0.0002174	0.8615	–0.01304*	0.0657	–0.007***	0.0006	0.0000000	0.9999	0.0228***	0.0018
Recession07	0.018527*	0.0511	–0.0052**	0.0348	0.025***	<0.0001	–0.000591	0.8149	0.011***	0.0075	–0.0046448	0.3937
MultiSEO	0.0039551	0.5958	–0.00168*	0.0620	–0.005807	0.6883	-0.001699	0.5718	–0.0032313	0.3826	0.0007147	0.9056
ROA	0.6176313	0.3154	–0.1773**	0.0145	1.2425**	0.0173	0.43484**	0.0192	0.0878078	0.5810	–0.575479*	0.0876
EquityToAssets	–0.147641	0.2785	0.0311719	0.1697	–0.33332*	0.0944			–0.0360488	0.1954	–0.0284598	0.801
Size	–0.0023194	0.3233	0.000830*	0.0846	0.001321	0.5207	–0.000672	0.2038	0.0020***	0.0013	–0.0027258	0.1006
Divpay	–0.0026771	0.1727	–0.000467	0.3531	–0.004***	<.0001	0.001106*	0.0712	–0.00172*	0.0556	0.0008958	0.3550
Cash	–0.14419**	0.0308	–0.002723	0.6904	0.000609	0.9934	-0.03236*	0.0746	0.0045955	0.7310	0.2672***	0.0010
Opaq	–0.0104805	0.7744	0.0009335	0.9584	–0.044671	0.6868	0.0701***	0.0045	–0.027189	0.1059	0.0458338	0.3246
Ohead	–0.021031	0.1642	0.00434**	0.0184	0.0457**	0.0491	0.0057478	0.1164	0.0054102	0.3938	–0.0054232	0.6287
Volume	–0.0000001	0.6290	0.0000001	0.8804	0.000001	0.6734	0.0000001	0.8374	0.000001*	0.0914	00.0000001	0.8271
OfferToEquity	0.0000087	0.9314	–0.000016	0.4848	0.000143	0.4676	–0.0001**	0.0324	0.0000655	0.3530	–0.0001026	0.7107
No. obs.	208		208		208		208		196		206	
Adjusted R^2	0.9469		0.6725		0.8823		0.9748		0.9981		0.7650	

References

Bayazitova, D. and Shivdasani, A., 2011, Assessing TARP, *Review of Financial Studies*, forthcoming.

Berger, A.N., Demsetz, R.S., and Strahan, P.E., 1999. The consolidation of the financial services industry: Causes, consequences, and implications for the future, *Journal of Banking and Finance* 23, 135−194.

Black, Lamont, and Hazelwood, Lieu, 2010. The effect of TARP on bank risk-taking, Working Paper, Federal Reserve Board of Governors.

Cangemi, Robert R., Mason, Joseph R., and Pagano, Michael S., 2011. Option-based structural modeling of bond recovery rates, *Journal of Financial Intermediation*, forthcoming.

Cornett, Marcia Millon, and Tehranian, Hassan, 1994. An examination of voluntary versus involuntary security issuances by commercial banks: The impact of capital regulations on common stock returns, *Journal of Financial Economics* 35(1), 99−122.

Demsetz, R.S., and Strahan, P.E., 1997. Diversification, size, and risk at bank holding companies, *Journal of Money, Credit, and Banking* 29: 300-313.

Deng, Saying, Elyasiani, Elyas, and Mao, Connie, 2010. Bank holding company derivatives usage, cost of debt and lending patterns, Manuscript presented at the Financial Management Association Annual Meeting, New York.

Elyasiani, Elyas, Mansur, Iqbal and Pagano, Michael, 2007, Convergence and Risk-Return Linkages across Financial Service Firms, Journal of Banking and finance, 31, 1167-1190.

Gasparro, Vincent, and Pagano, Michael S., 2010. Sovereign wealth funds: An early look at their impact on debt and equity markets during the 2007-2009 financial crisis, *Financial Analysts Journal* 66 (3), 92-103.

Kim, D.H., and Stock, D., 2010. The effects of TARP preferred stock issuance on existing preferred stocks, Working Paper, University of Oklahoma.

King, M.R., 2010. Time to buy or just buying time? The market reaction to bank rescue packages, Working Paper No. 288, Bank for International Settlements, Basel.

Keeley, M., 1989. The stock price effects of bank holding company securities issuance. Federal Reserve Bank of San Francisco *Economic Review* 1, 3−19.

Kolari, James W., and Pynnonen, Seppo, 2010. Event study testing with cross-sectional correlation of abnormal returns, *Review of Financial Studies* 23(11), 3996−4025.

Krishnan, C.N.V., Ergungor, O.E., Laux, P.A., Singh, A.J., and Zebedee, A.A., Examining bank SEOs: Are offers made by undercapitalized banks different? *Journal of Financial Intermediation* 19, 207-234.

Markowitz, H., 1952. Portfolio selection, *Journal of Finance* 7, 77−91.

Myers, S., 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147-176.

Myers, S., and Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 16, 187−221.

Newey, W.,West, K., 1987. A simple positive semi-definite, heteroscedasticity and autocorrelation consistent covariance matrix, *Econometrica* 55, 703−708.

Ng, Jeffrey, Vasvari, Florin P. and Wittenberg−Moerman, Regina, 2010. Were healthy banks chosen in the TARP captial purchase program? University of Chicago manuscript.

Norden, L., Roosenboom, P., and Wang, T., 2011. The impact of government intervention in banks on corporate borrowers' stock returns, Rotterdam School of Management manuscript, Erasmus University.

Polonchek, John, Slovin, Myron B., and Sushka, Marie E., 1989. Valuation effects of commercial bank securities offerings: A test of the information hypothesis, *Journal of Banking & Finance* 13(3), 443−461.

Saunders, Anthony, and Cornett, Marcia Millon, 2008. *Financial Institutions Management: A Risk Management Approach*, 6th edition, McGraw Hill, New York.

Slovin, Myron B., Sushka, Marie E., and Polonchek, John A., 1991. The information content of multiple seasoned common stock offerings by bank holding companies, *Journal of Banking & Finance* 15(3), 633−646.

Slovin, Myron B., Sushka, Marie E., and Polonchek, John A., 1992. Informational externalities of seasoned equity issues: differences between banks and industrial firms, *Journal of Financial Economics* 32(1), 87−101.

Slovin, M., Sushka, M., and Polonchek, J., 1999. An analysis of contagion and competitive effects at commercial banks, *Journal of Financial Economics*, 197−225.

Veronesi, P., and Zingales, L., 2010. Paulson's gift, *Journal of Financial Economics* 97, 359-368.

Yellen, Janet, 2009. The mortgage meltdown, financial markets, and the economy. *The B.E. Journal of Economic Analysis and Policy* 9(3) (Symposium) Article 3.