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LARGE CAPITAL INFUSIONS, INVESTOR REACTIONS, AND THE RETURN AND RISK-PERFORMANCE OF FINANCIAL INSTITUTIONS OVER THE BUSINESS CYCLE

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Abstract

We examine investors' reactions to announcements of large capital infusions by U.S. financial institutions (FIs) from 2000 to 2009. These infusions include private market infusions (seasoned equity offerings (SEOs)) 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 FIs' decisions to raise capital, the determinants of investor reactions, and post-infusion risk-taking of the recipients, 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 riskier and more levered. In the case of TARP recipients, they appeared to finance an increase in lending (as a share of assets) with more stable financing sources such as core deposits, which lowered their liquidity risk. However, we find no evidence that banks' capital adequacy increased after the capital injections.

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 stable 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 stabilize the markets in the aftermath of this crisis, the U.S. government established the Troubled Asset Relief Program (TARP) to recapitalize the 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 in promoting safe and sound business practices. 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 either through seasoned offerings in traditional capital markets or through non-market sources such as TARP injections.

We use event study and panel regression methods to investigate the immediate and longer term effects of the seasoned equity offering (SEO) or TARP injection 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.

[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*."

government TARP injections is similar to that of market capital injections from private sector investors.

The reaction to market capital injections might differ during times of stress, such as the recent financial crisis, from that of ordinary times, because of the signal that risk-averse investors take from an announcement of raising 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 study differs from Bayazitova and Shivdasani (2012), Black and Hazelwood (2010), and others who examine only the TARP program. In addition, unlike Krishnan, et al. (2010), we include SEOs of FIs both prior to 2006 and after 2006. In particular, we study the impact of capital injections by all types of U.S. FIs (banks, securities brokers, insurers, money managers, etc.) over the 2000-2009 period on the receiving firms' systematic risk and risk-adjusted excess returns, as well as their post-injection risk-taking behavior related to lending, liquidity, leverage, and other key risk categories. 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, the possibility that SEO announcements can send a negative signal about the firm's future prospects. Specifically, when there is a large informational asymmetry between insiders and external investors, firm managers with positive private information on their investment opportunities may refrain from issuing new equity, preferring to use internal financing to fund investment in positive net-present-value projects. This is because the new equity issues will be underpriced, as they will not fully reflect the managers' private information about the good investment opportunities.

On the other hand, if the managers have negative inside information and the firm is overvalued, they will tend to issue new equity. Similarly, if investors perceive that bank regulators have inside information based on bank examinations and surveillance, then if they see regulators forcing a bank to issue new capital, they would take this as a signal 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, thus creating an under-investment problem. In these scenarios, issuing equity could be interpreted as bad news (or less good news) compared with not issuing equity.

The reaction to a TARP injection may also be positive or negative. All else equal, receiving a government injection might be perceived as a negative signal if it is interpreted as an indication of undisclosed financial distress and excessively diluted shares of 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. Alternatively, such a capital injection could be seen as a sign that the firm is "too-big-to-fail" and, therefore, that it would receive a government-led rescue, if needed. This would be a positive from the investors' viewpoint. It could also be seen as positive news to the extent that the TARP injection was perceived as a funding source for new profitable projects. So 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.[2]

Thus, raising new equity, whether through a private market SEO or a TARP injection, can have advantages and disadvantages. Although some earlier studies have found negative investor reaction to bank SEOs, whether the advantages outweigh the disadvantages is still an important empirical question and one we address in this paper.[3]

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[2] 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 (2012) confirm Ng et al.'s finding and report positive initial investor reactions to TARP announcements. 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 owing to the potentially stabilizing and de-stabilizing effects of this unique type of long-term, quasi-government investment firm.

[3] 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 on 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 (2012) examine the effect of TARP preferred stock issuances on pre-existing preferred

Our main findings are as follows: (1) Investors' reaction to market issuances differs from their reaction to TARP injections. 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. This result is similar to those in some earlier studies that have found negative investor reaction to bank SEOs.

In contrast, we find that investors 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 basis points (bps) in market SEO events and +100 to +123 bps in TARP events. For TARP issuers, the risk-adjusted excess return (measured by the alpha from a market model regression) was significantly lower and the systematic risk (market beta) was significantly higher in the year after injections than in the year before. For market issuances, the changes in alpha and beta were insignificant. 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, for TARP recipients, we find that the increase in beta is economically, as well as statistically, significant, representing a 148-basis-point rise in the average cost of equity capital after receiving TARP funds (assuming a 5% equity risk premium).

We also observe that TARP recipients tended to have higher betas prior to issuance than non-issuers of similar asset size (1.11 vs. 0.86) and that the gap widened subsequent to the issuance. Recipients tended to have lower alphas before issuance compared with non-issuers and that gap was maintained after the TARP event. TARP issuers also had lower alphas and higher

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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 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.).

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 capital infusions are significantly related to certain characteristics of the issuing FI and the size of the issuance. For both TARP and private market injections, the post-announcement systematic risk (beta) is higher for larger FIs, while FIs with market SEOs 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 market 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) Although more leveraged firms (lower equity-to-asset ratios) are more likely to issue market capital and to receive a TARP injection, some factors that influence the decision to raise capital from private investors are different from those found to influence government-initiated TARP injections. For example, financial firms with lower dividend payments (an indicator of being more cash-flow constrained (see, e.g., Jensen, 1986, and Hennessy and Whited, 2007), were more likely to issue new market equity, but this factor is not significantly different for recipients of TARP and their matched non-recipients. We also find that banks and thrifts were somewhat less likely to have issued private market equity during 2000-2007, which may have necessitated TARP funding for these firms during this period.

(5) The post-capital-infusion risk-taking and financial performance of the issuing FIs and their matching non-issuing firms is strongly related to their past behavior, whether the capital injection was market- or government-based, and whether it occurred during a recession. We find no evidence that banks' capital adequacy increased after the capital injection. Instead, we find that firms that raised capital through either a private market issuance or 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 but lowered their liquidity risk by financing the additional lending more with traditional core deposits than with other sources of funds.

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 by the type of investor (private market or government) that was involved in the offering.[4] These reactions have certain policy implications. For example, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 authorized the Fed to issue countercyclical capital requirements for bank holding companies (BHCs), strengthening (weakening) capital requirements during expansions (recessions) as part of macroprudential capital policies to stabilize financial markets. Our results indicate that, under the pre-Dodd-Frank regulatory structure, investors have reacted 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

[4] 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 (2012) 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.

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 fundings of publicly traded FIs either through SEOs or TARP injections over the 2000-2009 period. These FIs include commercial banks, thrifts, and securities, insurance, investment management, and other financial firms within SIC codes 6000-6799; 267 different FIs issued these offerings during the sample period.[5] We define large capital infusions as infusions greater than 10% of the firm's existing common equity. Of the 356 large fundings, 125 were TARP injections and 231 were offerings in the private capital market (which we will call market issues). Figure 1 shows the number of SEOs and TARP injections for each year of our sample, while Figure 2 displays the breakdown across the various SIC codes, with the majority of SEOs and TARP injections funding depository FIs (SIC codes 6000-6099).

The TARP was established under the Emergency Economic Stabilization Act passed by

[5] 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 because of 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.

Congress on October 3, 2008. Although the program was originally intended to purchase up to $700 billion of toxic assets from FIs, it was revised on October 14, 2008 and included several programs. One of these, the Capital Purchase Program, was authorized to inject $250 billion into FIs. Note that, even though technically under TARP the FIs sold preferred stock and warrants to the U.S. government, we think it is appropriate to treat the 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.[6]

We randomly match each issuing FI with an FI that did not have a capital injection 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.[7]

The matching process involves first computing the differences in asset size and 3-digit SIC codes between the issuing FI and all possible non-issuing FIs based on data at the end of the year preceding the capital infusion. The issuing firm is then matched to the non-issuing FI that

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[6]In addition, preferred stock is a hybrid security that has several elements that are equity-like in nature. 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. 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 (e.g., see the U.S. Treasury's reports on the disposition of TARP investments at: http://www.treasury.gov/initiatives/financial-stability/reports/pages/default.aspx). Thus, in our view, the TARP investments were economically similar to a SEO, although in this case there was only one long-term investor (the U.S. government) rather than a widely dispersed set of private investors with varying holding periods and investment objectives.

[7] 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. Hence, we present our results with these nine capital injections included in our sample.

minimizes the sum of squared differences in asset size and SIC code. This methodology is similar to that used in the literature, e.g., by Huang and Stoll (1996). Note that this method treats differences in asset size and differences in industry classification similarly. Thus, it provides some flexibility in that it does not force, say, a large commercial bank to be paired with a much smaller commercial bank if there are no other viable matches within the commercial banking SIC code. Conversely, the method will not match two firms that are quite close in size if they are in much different SIC categories.

On the other hand, a possible drawback of the flexibility of the matching methodology is that it could lead to some pairings where an issuing FI and its corresponding match are in (moderately) different SIC categories if the two firms are of very similar size. For example, an insurance broker could be matched with an insurance carrier or a publicly traded single-bank commercial banking entity could be paired with a bank holding company if the paired firms are close in terms of asset size.[8] This does not appear to be a significant issue for our sample. To test the robustness of our results, we re-estimated our models dropping the 37 pairs (10.4% of the sample) in which the issuer and its matched firm were not in the same 2-digit SIC category. All of our main results and conclusions are robust to using this smaller sample of 319 capital infusions. As an additional robustness check we also restrict the sample to pairs involving only banks or thrifts (depository institutions), which results in 241 pairs. We find that our results are quite robust to using this smaller sample.[9]

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[8] We thank an anonymous referee for pointing this out.

[9] For example, in the sample that omitted the 37 pairs, there were only 3 deals where a single-entity commercial bank was matched with a bank holding company and another 11 deals where such a bank was matched with a thrift institution. These 14 deals represent only 3.9% of all transactions in our sample and, as noted above, our results are not affected by exclusion of these observations. One could imagine doing other robustness tests, such as including only pairs that match bank holding companies with bank holding companies and independent banks with independent banks, but this would result in even smaller sample sizes and we thought it best not to pursue this approach.

2.2 Empirical questions

We investigate three major questions concerning capital injections:

(1) How do investors react to large SEOs and TARP injections? Do the reactions differ between TARP and market capital injections, and with the characteristics of the issuer and 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 market 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 risk-taking and financial performance, we ask: How do an issuing firm's post-capital injection risk and performance differ relative to those of firms that did not receive a capital injection and does this post-capital-injection 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.[10] The time-series model we estimate is:

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

[10] 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).

where,

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

$\kappa_{m,t}$ = 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 public announcement of its seasoned capital injection on day t (and zero otherwise). Note that SNL Financial, the source of our data, takes the date of the firm's filing with the SEC as its public announcement date;

$\alpha_{0,s}$ = *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.[11]

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 for market issuances and for TARP injections. 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 capital infusion 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 market and TARP issues).

Beyond the univariate results of Table 2, it is also useful to investigate the impact of the FIs' financial characteristics (proxied by *ROA, EquityToAssets, Divpay,* and *Size*) on investors' reactions to capital injections within a multivariate setting. Accordingly, we perform second-

[11] 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 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, 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.

stage regressions of the individual firms' post-capital infusion alphas and betas on the firm-specific independent variables noted above, 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 when the economy was in recession during 2001 or 2007-2009. This approach not only enables us to control explicitly for differences in financial leverage (e.g., under- versus over-leveraged firms) but also allows us to investigate whether theimpacts of capital injections on an FI's alpha and beta were dissimilar during these two recessionary periods.[12]

Another important question for both policymakers and investors pertains to which FIs are most likely to need a market SEO or TARP capital injection. Thus, to understand the key factors that influence an FI's decision to raise capital, we estimate for both types of capital injection (market SEOs and TARP infusions) a probit model in which the binary dependent variable (y_s) equals 1 if the firm announces a large capital infusion, 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 including fixed effects within a probit specification, we include a dummy variable, *bankdum*, set to 1 if the FI is a depository institution such as a commercial 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 zero if the firm announced a private market SEO. Our estimated models based on a panel data set are described by Eqs. (2) - (4):

[12] 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.

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

$$\beta_s^* = \lambda_0 + \lambda_1\ \mathrm{ROA}_s + \lambda_2\ EquityToAssets_s + \lambda_3\ Size_s + \lambda_4\ DivPay_s + \lambda_5\ Bankdum_s + \lambda_6\ OfferToEquity_s + \lambda_7\ Recession01_t + \lambda_8\ \mathrm{Recession07}_t + \lambda_9 \mathrm{MultiSEO} + \Lambda' FixedEffects\ + \omega_s \quad (3)$$

$$\Pr(y_s = 1) = \delta_0 + \delta_1\ \mathrm{ROA}_s + \delta_2\ EquityToAssets_s\ + \delta_3\ Size_s + \delta_4\ DivPay_s + \delta_5 Bankdum_s + \delta_6\ Recession01_t + \delta_7\ \mathrm{Re}cession07_t + \lambda_8 \mathrm{MultiSEO} + \xi_s \quad (4)$$

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 $\beta_{0,s} + \beta_{1,s}$;

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 depository institution such as 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 shareholder equity for the calendar year prior to this capital issuance);[13]

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

$Recession07_t$ = 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;

$\varepsilon_s, \omega_s, \xi_s$ = 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) and (3) with industry fixed effects (dummy variables for the 40 4-digit SIC codes that represent sub-industries within the SIC financial services category).[14] 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 risk-taking and financial performance of a key sub-

[13] 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.

[14] 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.

sample of our FIs: BHCs. We proxy risk and performance with six different measures related to lending activity and risk-taking behavior, measured over the year following the capital infusion, and we regress each of these variables on independent variables, including the value of the dependent variable in the year prior to the injection, 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 injection to account for possible endogeneity and delayed effects, and we adjust the standard errors in the model for clustering by year.[15] 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 risk and 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;

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

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 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 market), and zero otherwise; and

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 market and TARP capital injections are reported in Table 1, panels A and B, respectively.[16] We find evidence that investors reacted negatively to the news of market SEOs, but positively to TARP injections. In the case of market issues, the 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.[17, 18] All other windows up to −10 to +10 days surrounding the event

[16] As noted earlier, this table reports results for the Fama-French (including momentum factor) model as well as the market model; however, because the results are similar, to save space, the text discusses only the results from the market model.

[17] 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 because many firms experienced an event at, or near, the same date.

show insignificant effects for the issuing firms. In theory, there can be competitive and/or contagion effects from capital injections 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 recipient firms, while contagion effects would be in the same direction. Although such effects are observed in other studies, such as those conducted 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-sample includes firms with both competitive and contagion effects, resulting in a zero overall effect.[19]

We find that the market distinguishes between TARP and market 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 market injections, averaging +99.7 bps over the 2-day period (t = 0 and t = +1) versus −56.6 bps for market issues.[20, 21] Again, in the majority of other windows up to −10 to +10 days surrounding the event, the CARs are found to be insignificant.

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[18] This significantly negative relationship still holds up in the alternatively matched subsample with 37 fewer deals, although the CARs are somewhat smaller at −35.5 bps and −37.8 bps for the market model and Fama-French models, respectively.

[19] 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.

[20] This significant positive relationship for TARP deals is maintained when using the subsample including only depository FIs and in the alternatively matched subsample. For the sample using only the 241 depository FIs, this 2-day CAR is +101.6 bps based on the market model regression and +122.0 bps using the Fama-French model. For the alternatively matched sample with 37 fewer observations, the market model's 2-day CAR is +85.4 bps but is a bit weaker, with a p-value of 0.1446. However, this CAR is +102.6 bps and continues to be significant for this sub-sample when we use the Fama-French model. Overall, the picture painted by the full sample results of Table 1 remains intact when we restrict the sample: Investors still react negatively to market issuers and positively to TARP recipients, but they are neutral toward all types of non-issuers.

Our general finding of a lack of significant 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 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,

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[21] Similar to Bayazitova and Shivdasani (2012), we find that the nine major FIs that were part of the original set of TARP injections (as reported in the *Wall Street Journal* on October 14, 2008) had the largest stock market reaction to this news (+11.96% for a two-day event window) but all other subsequent TARP recipients also observed a +0.58% abnormal return. Thus, our results are not driven solely by the initial TARP investments in October 2008.

taken together with those of Gasparro-Pagano (2010) and Norden, Roosenboom, and Wang (2011), indicate that the source of, and the economic environment surrounding, the capital infusion 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 (Eqs. (3) and (4)) are reported in Table 2. Panels A-B and C-D display the summary statistics for the market and TARP events, respectively. Panel E compares characteristics of TARP issuers, market SEO issuers, and all non-issuers (i.e., non-issuers matched with either a TARP issuer or a market issuer). These statistics reveal the following:

(1) *For market issuances, issuers and non-issuers had similar risk-adjusted excess returns before and after the event (as indicated by their average alphas and change in alpha). But for TARP injections, TARP recipients had lower excess returns than non-recipients and their excess return declined more sharply after the event.* In particular, prior to the announcements, the alphas for TARP recipients averaged −11.6 bps and those of the matching firms averaged −5.0 bps, and the difference between the two was statistically significant (as shown in Panels C and D of Table 2). In the post-event period, the alpha for TARP-related recipients decreased more sharply than that for the full sample (−13.1 vs. −7.3 bps). Also note that, as shown in Panel E, TARP recipients had lower alphas than private market SEO issuers (−13.1 vs. −4.0 bps).

(2) For market issuances, the systemic risk of issuers and non-issuers were similar before and after the SEO, as indicated by their average betas and change in betas but *TARP recipients had greater systematic risk than non-recipients and market SEO issuers, and the difference in systematic risk widened after the capitalization.* As shown in Panels C and D of Table 2, TARP recipients were riskier prior to their capital injections, relative to their non-recipient matched firms, as indicated by their betas (1.11 vs. 0.86). In other words, riskier firms chose to receive additional capital via TARP. Also, TARP recipients 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 TARP injection. Specifically, the average beta for TARP recipients rose by 0.295 (+27%), while non-recipients' 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 TARP recipients and non-recipients – TARP recipients were perceived as riskier than non-recipients 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 riskier projects after the injection. The fact that the beta of non-recipients also rose (although by less) indicates that there was indeed some risk spillover (or contagion) from the recipients to non-recipients.[22] As reported in Panel E, TARP recipients were not only riskier than non-recipients, 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

[22] It is possible that not only has the riskiness of the recipient and non-recipient 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.

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 may not have been wholly successful or else they were outweighed by the other incentives created by TARP funding, at least in the immediate post-injection period.

Recall that another objective of TARP (albeit 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-recipients 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 solely 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, reported in Table 2, for both market issuances and TARP injections , the issuer and recipient firms are similar to non-issuers and non-recipients in terms of size (total assets and total market value of equity), and operational efficiency (overhead expenses to

revenue). But relative to non-issuers and non-recipients, on average, issuing and recipient FIs had statistically significantly lower return on equity and a lower equity-to-assets ratio, the latter of which may be a driving force behind the capitalization decision, examined in the next section. Panel E's univariate comparison indicates that among firms issuing private capital and TARP recipients, the TARP recipients were larger, less cash-flow constrained, less profitable, less liquid, and less efficient, and they received injections that were smaller in size than the issuances by the private capital group.

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).[23] Results in Panels A and B indicate that in market issuances, excess return performance (as measured by alpha) is greater 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 that are unable to raise capital in a weak economy. As shown in Panels C and D, for TARP recipients and non-recipients alike, alpha is greater for smaller firms.

Post-SEO announcement systematic risk (as measured by beta) for market issuances is higher for firms that are more profitable (*ROA*), more highly capitalized, and larger in size. Beta values are also lower for larger equity issues (*OfferToEquity*) and when the issuance occurred

[23] Based on the earlier results in Table 2 showing significant differences across sub-samples of the data set, we focus here on this four-way split of the data (TARP vs. market and issuer vs. non-issuer). In addition, we estimated the models in this section using a pooled sample rather than this four-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 subsample results throughout the rest of the paper.

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 during the pre-TARP period. The issue-size effect may reflect reverse causality. Rather than large issues leading to lower post-event risk (and, therefore, lower betas), it could be that FIs with lower betas can attract larger amounts of capital from risk-averse investors and therefore have larger issue sizes. The *Recession01* and *Recession07* dummy variables also demonstrate that the two recessions that occurred within our sample period were quite different in terms of their impact on beta. For market issuances, while beta was lower during the 2001 recession for both issuers and nonissuers, it was higher for both during the 2007 recession that coincided with the crisis. The differences in signs and significance of these parameters highlight the substantially more severe and uncertain economic conditions during the "Great Recession" of 2007-2009.

We also find that larger issues in both market SEOs and TARP injections had higher betas.[24] The relationship we find between size and beta for both market issuers and TARP injections, as well as non-issuers and non-recipients, 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

[24] As noted earlier, we also checked to see if the original set of TARP injections to nine 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 events in October 2008. For both our alpha and beta second-stage regressions, we find that the original TARP recipients benefited from these capital injections, as their alphas were higher (+0.39%) and their betas lower (by –0.83) than subsequent TARP injections. In addition, the original TARP recipients were less likely to issue an SEO during the pre-TARP period (thus possibly necessitating the need for much larger capital injections in 2008-2009). In addition, these original TARP recipients were less aggressive during the post-TARP period in their lending than other TARP recipients and still relied more extensively on non-deposit financing and off-balance sheet activities. However, despite these differences, our overall results and the main findings discussed in Section 3 remain intact even after controlling for these original TARP firms. Thus, it seems not to matter to investors whether the capital injection 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 for us to control indirectly for the possibility that a TARP infusion might have been forced upon an FI.

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 additional capital. Panels A and B show that market issuer 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). 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 market funding for banks and thrifts, as well as for FIs with looser financial constraints.

3.5 Post-capital injection 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 4, we find no evidence that firms that issued market capital or that received a TARP injection increased their capital adequacy (as indicated by the insignificant coefficient on *Targetdum*). However, we do find weak evidence via the *Targetdum* coefficient in column 1 (significant at 10%) that issuers did raise their level of lending activity (as a ratio of assets) after a capital injection, with TARP and market 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.

Comparing the two recession variables we find that after market capital issuances during the 2001 recession, capital adequacy fell and interest rate risk rose; there is weak evidence that

liquidity risk fell as well. In contrast, following market capital issuances during the 2007 recession, off-balance-sheet risk and liquidity risk both rose, while credit risk fell. However, after the TARP injections undertaken during this recession, there was a slight increase in credit risk and a smaller increase in liquidity risk compared to market SEOs during the period.

Taken together, our results suggest that the TARP may have enabled some recipients to increase lending–and therefore, their credit risk–but these recipients funded more of these loans with traditional core deposits and, therefore, their liquidity risk was lower (compared to FIs with market injections during this period).

4. Conclusion

This study investigates investors' reactions over the immediate and longer-term horizons to financial institutions' announcements of capital infusions through private-market transactions and TARP injections. 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 raise additional equity capital through seasoned equity offerings (SEOs) and TARP funding. We also provide evidence on the risk-taking and financial performance of issuers and their matched nonissuers in the post funding period.

We find that:

(1) Investors reacted negatively to the news of capital injections through market funding both in the immediate term (i.e., the two days surrounding the announcement) and over the subsequent year, but their reaction was positive to TARP injections. The positive reaction to TARP injections might signal that investors took such funding as an indication that the recipients would be treated as "too-big-to-fail," or that the funding would make them less likely to fail relative to non-recipients. 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-injection period. We also find that banking-related firms were less likely to raise capital through market SEOs in our 2000-2009 sample. This reluctance may have made these types of firms more vulnerable and the overall banking system less stable when the financial crisis hit, potentially prompting the need for the TARP program.

(2) Investors' reactions to news of capital injections are significantly related to the FIs' prior financial condition, including profitability, capitalization, and size. For market 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 they received 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 market 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 weaker evidence that FIs increased their lending as a share of assets after both TARP and private-market 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, owing 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-injection financial performance suggests that TARP-related events do not affect capital adequacy but are associated with increased lending and alter 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 Capital Injections by Year

This graph displays the number of private market seasoned equity offerings (SEOs) and TARP injections for each year during the sample period 2000 - 2009.

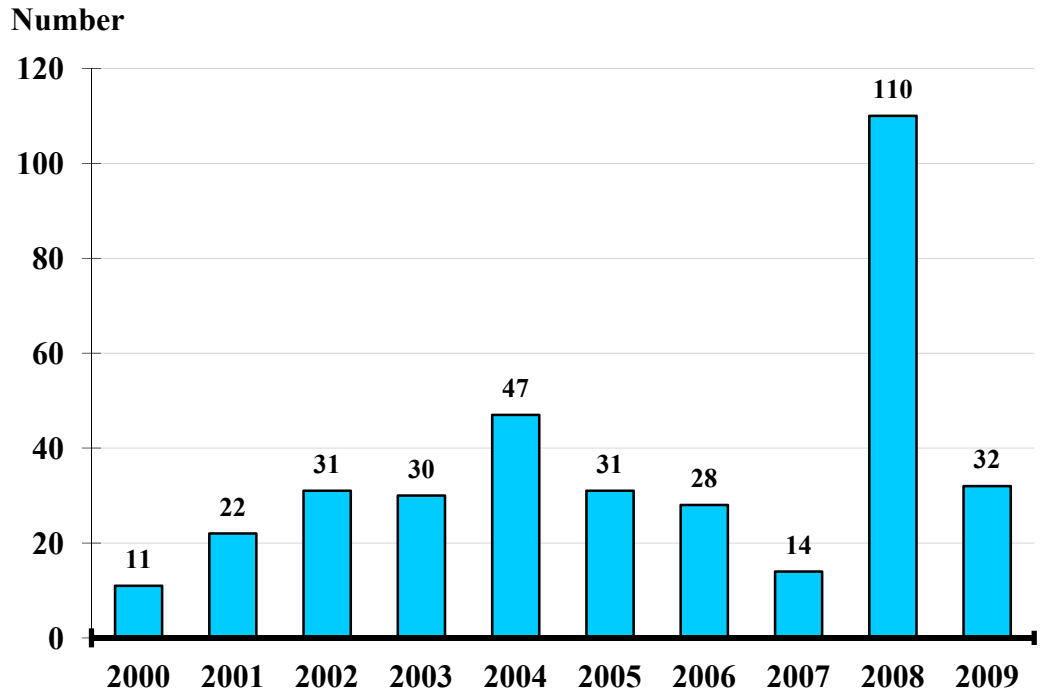

Figure 2. Distribution of Market SEOs and TARP Injections by Industry

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.

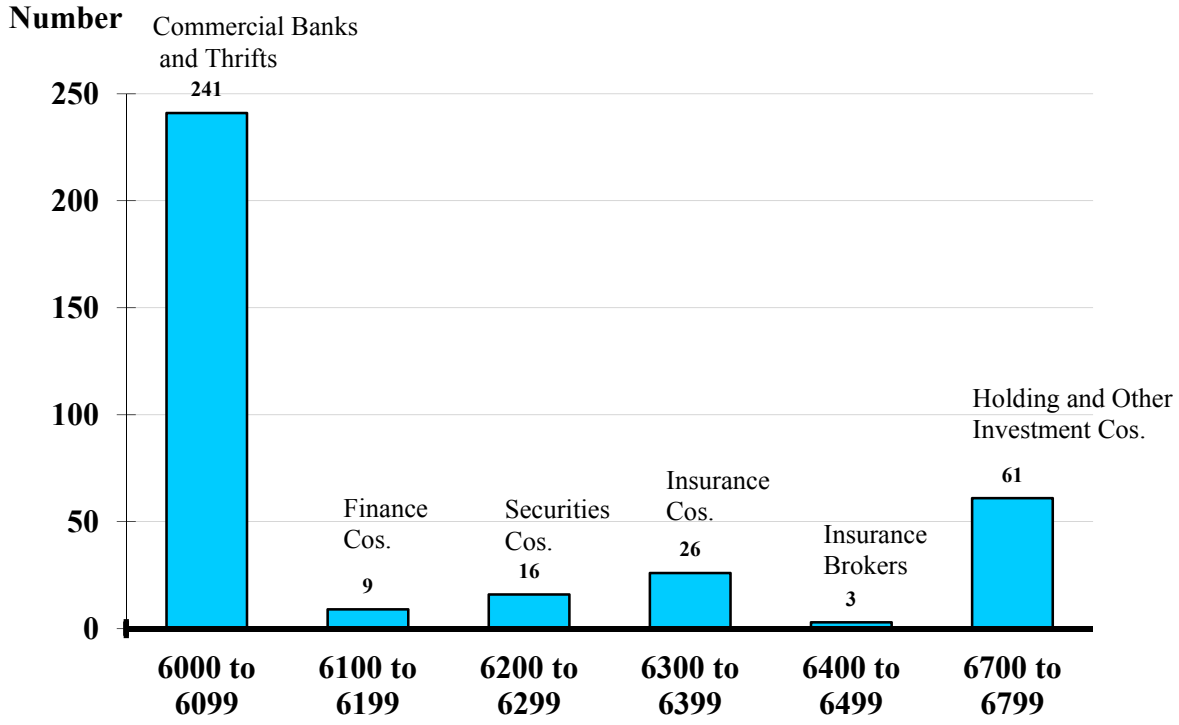

Table 1. Cumulative Abnormal Returns (CARs)

These CAR estimates for market and TARP funding 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. Market Issuances

	Issuing Firms (N = 231)		Non-Issuing Firms (N = 231)	
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

	Recipient Firms (N = 125)		Non-Recipient Firms (N = 125)	
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 to 5. Panel A displays statistics for firms that issue a large amount of equity capital (*Issuing Firms*) in a market SEO, while Panel B shows similar statistics for their matched *Market Non-issuing Firms*. In Panel A, we report the results of difference-in-means tests by comparing the *Market Issuing Firms'* average values to the *Market Non-issuing Firms'* averages. Panels C and D report similar statistics for the sample of TARP injections. Panel E presents statistics comparing market issuers, TARP issuers, and non-issuers.

		Panel A. Market Issuing Firms			**Panel B. Market 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

Statistically significant differences between the values in the two panels are denoted at various confidence levels as follows: * 10%, ** 5%, and *** 1%.

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

		Panel C. TARP Issuing Firms			Panel D. 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

Statistically significant differences between the values in the two panels are denoted at various confidence levels as follows:
* 10%, ** 5%, and *** 1%.

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

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

Variable	Description	TARP Issuing Firms Mean	Market 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 Market Issuing Firms at the 10% level
†† TARP Issuing Firms significantly different from Market Issuing Firms at the 5% level
††† TARP Issuing Firms significantly different from Market 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. Market events: Issuers				**Panel B. Market 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 for large capital infusions (i.e., an SEO or TARP injectiontotaling 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 and non-recipients, respectively. Panel C reports the results for TARP infusions, where the comparison group are market 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. Market 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			
Parameter	Estimate	S.E.	Chi Square	p-value
Intercept	–3.6373***	0.8848	16.90	< 0.0001
ROA	0.9379	12.463	0.01	0.9400
EquityToAssets	3.4387	3.3521	1.05	0.3050
Size	–0.0159	0.0784	0.04	0.8392
Divpay	0.9829***	0.2993	10.79	0.0010
Bankdum	1.5031***	0.3757	16.00	< 0.0001
Recession01	–5.2305	15682.1	0.00	0.9997
Recession07	3.1089***	0.2684	134.1	< 0.0001
MultiSEO	0.0868	0.3055	0.08	0.7763
No. obs.	356			

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 market 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	

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