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

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Abstract

We examine investors' reactions to announcements of large secondary equity offerings (SEOs) by U.S. financial institutions (FIs) during the 2000-2009 period. 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 boom and bust phases of the business cycle and the recent financial crisis. We also present evidence on the factors affecting FI decisions to issue capital and the determinants of investor reactions. We obtain four major results: (1) 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 government TARP injections; (2) investors' reactions to non-TARP and TARP capital infusions differ depending on the characteristics of the FIs, including profitability, leverage, offering size, and asset size; (3) FIs are more likely to issue SEOs in the private market when they are smaller, less-capitalized, and more financially constrained, whereas TARP injections were more likely for larger FIs and for banks and thrifts than for other types of FIs; (4) investor reactions differ depending on the state of the business cycle and conditions of financial crisis. In particular, equity offerings by FIs during the 2007-2009 crisis period were followed by significantly higher systematic risk, as measured by the average firm beta, for both non-TARP and TARP infusions. Our results are economically, as well as statistically, significant. For example, in response to SEO announcements, the average beta of issuing FIs rose by 0.17 (or +21%) while the betas of a control sample of non-issuing FIs rose by 0.11 (+16%). Based on a 5% equity risk premium, this greater systematic risk translates into an economically significant rise in the cost of equity capital of 85 basis points for issuing firms and 55 basis points for non-issuing firms.

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 recent financial crisis 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] 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 private markets or through non-market sources such as the Troubled Asset Relief Program (TARP).

We use event study and panel regression methods to investigate the immediate and longer-term effects of the secondary equity offering (SEO) announcements for a broader set of publicly traded financial institutions and for a more recent time period than has been investigated in the literature and which includes the recent financial crisis. Our sample includes 358 large SEOs of publicly traded stock over the 2000-2009 period from commercial banks, thrifts, securities, insurance, investment management, and other financial firms within SIC codes 6000-6799.[2] As Figure 1 shows, approximately two-thirds (66.2%) of the sample represent depository

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[1] Janet Yellen (2008) 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*."

[2] By "large" we mean offerings that are 10% or more of the firm's common equity in the year prior to the offering. 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

FIs (commercial banks and thrifts in SIC codes 6000-6099) while 17.0% of the FIs are financial holding companies and investment management firms in SIC codes 6700-6799. The remainder of the sample is dispersed across FIs categorized within SIC codes 6100-6500, which include insurance companies, securities firms / brokers and others.

For the 358 issuances, we matched a control sample of non-issuing FIs, for a total of 716 observations. The matched sample includes FIs that did not issue large amounts of capital during the two years surrounding the corresponding FIs' capital offering announcements. We estimate the Markowitz (1952) market model to determine the sample FI's abnormal stock returns on the days surrounding the announcement of a SEO, the change in the FI's risk-adjusted excess return (as measured by alpha in the market model), and the change in its perceived market riskiness in the eyes of the investors (as measured by beta).[3] We also investigate how investor reactions and an FI's decision to raise capital vary with characteristics of the FIs.

Because our sample period covers the recent financial crisis in which certain institutions received TARP funding, we are able to explore whether these effects differ for the 127 TARP capital infusions in our data compared to offerings in the private capital market (which we will call non-TARP issues). We also investigate whether investor reactions differed for announcements made during the two recessions in our sample period compared with those made during economic expansions, and whether the period of the recent financial crisis elicited a different response over what was accounted for by the fact that the economy was also in recession. Our study is the first to investigate whether investor reactions to equity offerings

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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.

[3] As we will discuss later, we also test some of our hypotheses using a more complex model including Fama-French and momentum factors and we find similar results. Thus, we focus most of our discussion on the market model results.

differ over the business cycle and during the financial crisis; as well as whether the reaction to the U.S. government's TARP injections is similar to that of market capital injections from private investors.

Firms can experience several advantages and disadvantages by raising capital via SEOs. The announcement of a 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 a SEO.

On the negative side, Myers and Majluf (1984) first noted 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 to invest in positive net present value projects since the new equity issues will be underpriced, as they will not 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 conditions. In these scenarios, issuing equity could be interpreted as bad news (or less good news) compared with not issuing equity. In addition, selling new equity is dilutive to existing shareholders relative to

bond issues and internal financing, which keep the number of shareholders intact. Thus, whether the advantages outweigh the disadvantages of issuing new equity is an important empirical question.

We have four main findings: (1) Investors reacted *negatively* to the news of private 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 bps in non-TARP events and +100 to +123 bps in TARP events. For issuers, the risk-adjusted excess return (alpha) was significantly lower and the systematic risk (market beta) was significantly higher in the year after injections than in the year before. The increase in beta 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 find that issuers tended to have higher betas prior to issuance than non-issuers of similar asset size (0.81 versus 0.72) and that the gap widened subsequent to the issuance.

(2) Investor reactions to the announcements of large SEOs are significantly related to certain characteristics of the FI, the issuance, and the state of the business cycle. For non-TARP injections, the post-announcement systematic risk for issuers is higher for larger, more profitable, and better capitalized issuers, especially during the recent financial crisis. In addition, the alpha estimates that measure the post-announcement risk-adjusted excess return are lower for smaller and less profitable issuers.

(3) Factors that influence the decision to raise private capital are different from those found to influence government-initiated TARP injections. Banks with a lower equity to asset ratio (higher leverage), smaller asset size, and lower dividend payments (an indicator of being

more cash constrained) were more likely to issue new equity, perhaps because they are less able to use internal financing. In general, larger FIs, as well as banks and thrifts, were more likely to get a TARP injection than other types of firms.

(4) Investor reactions differ depending on the state of the business cycle and conditions of financial crisis. In particular, equity offerings by FIs during the 2007-2009 crisis period were followed by significantly higher systematic risk, as measured by the average firm beta, for both non-TARP and TARP infusions. In addition, the risk-adjusted excess returns for TARP recipients were significantly lower after receiving the TARP funds.

Overall, our findings suggest that investor reactions to SEOs by U.S. financial institutions 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 or government) that was involved in the offering.[4] These reactions have certain policy implications. For example, the recently enacted Dodd-Frank financial reform legislation 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 and positively to SEOs during recessions. While these reactions may change in 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 policy more costly to implement.

[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 (2010) shows 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.

The rest of the paper is organized as follows. Section 2 describes our hypotheses and section 3 discusses the model and the data. Section 4 presents our empirical results, and Section 5 provides the conclusions.

2. Hypothesis development

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 typically 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, Slovin, and Sushka, 1989, Keeley, 1989, Slovin, Sushka, and Polonchek, 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.

We develop and test several hypotheses concerning capital injections, both through private market financing and TARP funding, and investor reactions to these events. Our first hypothesis concerns the direction of the market reaction to large capital infusions. As discussed earlier, news of a large capital issuance can be viewed negatively due to adverse selection problems and the potential for equity dilution, or positively because the funds bolster the issuing firm's capital position, give comfort to regulators, and provide a source for pursuing profitable investment opportunities. In particular, the reaction to a capital injection may vary depending on the source of funding and the surrounding economic environment. For example, the reaction to TARP

injections may be positive to the extent that the market views the injection as a signal of bank health.[5] Thus, we hypothesize:

> **H_1:** ***Investors react negatively to large private market capital infusions and positively to TARP capital injections.***

As noted in prior research on SEOs for non-financial firms, conditions that are specific to individual firms, such as capital-ratio requirements and cash-flow constraints are likely to affect the decision by firms to raise capital through SEOs. We investigate this by estimating a probit model in which the binary dependent variable equals 1 if the firm has announced a large capital infusion, and zero otherwise, and the independent variables include firm financial characteristics. 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 and the source of funding. In particular, investor reactions are likely to differ for non-TARP and TARP injections due to differences in the reason and source of the capital infusion, as well as what signal investors are likely to extract about the prospects for the firm going forward.[6] Investor reactions might also interact with economic environment. For example, receiving a government injection might be perceived as a negative signal, all else equal. However, in a very poor economic environment in which investors expect many firms to fail, receiving government funding can be interpreted as positive news because it might be seen as a "vote of confidence" in the FI's prospects by the government. We investigate the following hypotheses:

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[5] Ng, Vasvari, and Wittenberg-Moerman (2010) find evidence that healthier banks were selected to be participants in TARP's Capital Purchase Program.

[6] 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.

H_2: ***A firm's decision to raise additional capital is influenced by firm characteristics. The impact of these characteristics may differ between non-TARP and TARP injections.***

H_3: ***Investor reactions to capital injections will vary depending on a firm's characteristics, and by the type of injection (non-TARP versus TARP).***

As described in the next section, we can test our hypotheses via difference-in-mean tests and by regressing the estimated individual firms' alphas and betas after a capital infusion announcement (obtained from a time-series estimation of the market model) on firm financial characteristics and type of injection.

Prior research also suggests that the relative size of the offering might affect investor perceptions about a firm's alpha and beta values (Cornett and Tehranian, 1994). 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 expect a larger deal (as measured by the *OfferToEquity* variable) to lead to a lower alpha and a higher beta, which corresponds to the following hypothesis:

H_4: ***Investor reactions to capital infusion announcements vary depending on the size of the capital issued in relation to the firm's existing equity base.***

If investors are risk-averse and their risk-aversion varies in tandem with economic conditions, we would also expect investor reactions to capital offerings to vary over the course of the business cycle. To test this view, we include a dummy variable, *Recession*, to identify NBER recession periods. In our sample there are two recessions, March 2001 – November 2001 and December 2007 – June 2009. We investigate:

H_5: ***Investor reactions to capital infusion announcements are dissimilar in recessions and expansions.***

The financial crisis of 2007-2009 was among the most severe in U.S. history and its start centered in the financial services industry. In particular, many FIs were over-leveraged (undercapitalized) before this crisis occurred and held substantial amounts of overvalued mortgage-based instruments. To moderate the effects of this crisis, the government established TARP to recapitalize undercapitalized FIs. We investigate whether investors reacted differently to announcements of capital infusions during this crisis compared to those in the pre-TARP period and whether the reactions to TARP infusions were different from those to non-TARP infusions.

The large increase in uncertainty in the financial system due to the recent financial crisis is likely to have driven risk-averse investors to react more negatively to firms that raised private (non-TARP) capital in that type of market climate than they would have in general recessionary periods. In this scenario, we expect the large capital infusions taking place during this period to lead to lower risk-adjusted performance (negative alphas) and higher systematic risk (an increase in betas). It is less clear, however, whether the market's short-term reaction to an FI receiving TARP funds would be similar. Receiving TARP funding could have been interpreted as positive news if it was a signal of healthier firms (as noted in Ng, Vasvari, Wittneberg-Moerman, 2010), or that the firm was "too-big-to-fail" and would receive a government-led rescue if needed. But TARP funding could have spurred a negative reaction if it was interpreted as a signal of financial distress and excessively diluted existing shareholders. This leads to hypothesis H3 noted earlier, as well as the following hypothesis:

> **H_6:** ***Investors reacted more negatively (in terms of perceived riskiness and risk-adjusted performance) to capital infusions made by financial firms during the financial crisis than at other times.***

3. Data and model specification

3.1 Data

The data used in the analysis come from several sources. After combining data from SNL Financial, the Center for Research in Security Prices (CRSP), and Compustat, and filtering them for outliers, we obtain usable data on 358 large SEOs by FIs (firms in SIC codes 6000-6799) over the period 2000-2009. Figure 1 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 358 large SEOs, 127 were TARP injections and 329 different FIs issued these offerings during the sample period.[7] For each issuing FI, we randomly match a FI that did not issue a large amount of equity capital 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.

3.2 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

[7] Note that we treat the TARP investments as SEOs even though technically the FI's sold preferred stock to the U.S. government. We suggest that it is appropriate to treat these TARP investments as SEOs because most investors, the general public, and the FI's 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, in effect, the TARP investments can be viewed as "delayed secondary common equity offerings" where the U.S. government's funds served as an intermediate step in this SEO process. In addition, the vast majority of FIs in our sample issued only one SEO during 2000-2009 (81%). However, 61 FIs (19%) issued more than one SEO with nearly two-thirds of these firms (66%) issuing just two SEOs during the period. Thus, less than 6% of the FIs issued more than two SEOs.

term, alpha, serves as a measure of the firm's risk-adjusted "excess" performance.[8] The time-series model we estimate is:[9]

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

where,

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

$\kappa_{m,t}$ = 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,

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

[9] The above model can be expanded 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 which 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. We re-estimate (1) using this alternative Fama-French model and find 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.

$\alpha_{1,s}$ = change in *alpha* = intercept shift, a measure of change in the *s*-th firm's *alpha* in response to announcement- and post-announcement effects as described by $Event_{s,t}$,

$\beta_{1,s}$ = change in *beta* = slope shift, a measure of change in the *s*-th firm's market *beta* in response to announcement- and post-announcement effects 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 nonissuers) 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 heteroskedasticity using the Newey and West (1987) method. Thus, we estimate 716 GMM regressions in total.

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 changes in alpha (beta) should be negative (positive), 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.

To investigate the factors that influence a FI's decision to raise capital, we estimate a probit model in which the binary dependent variable (y_s) equals 1 if the firm announces a large secondary capital offering, and zero otherwise. The model's independent variables include both firm characteristics and two time-related dummy variables (*Recession* and *Crisis*) that indicate whether the capital injection occurred when the economy was in recession and/or during the financial crisis of 2007-2009. Similarly, we investigate the impact of the FI's financial characteristics (proxied with *ROA, EquityToAssets, Divpay,* and *Size*) on investors' reactions to capital injections by regressing the estimated individual firms' alphas and betas after a capital infusion on these independent variables, as well as a the relative size of the capital offering (*OfferToEquity*) and a dummy variable that equals 1 if the FI is a commercial bank or thrift institution because the deposit-taking nature of these firms might be an important factor for investors to consider (*Bankdum*).. Our estimated models based on a panel data set are described by Equations (2) - (4):

$$\begin{aligned}\Pr(y_s = 1) = \delta_0 + \delta_1\ \mathrm{ROA}_s + \delta_2\ EquityToAssets_s + \delta_3\ Size_s + \delta_4\ DivPay_s + \delta_5 Bankdum_s \\ + \delta_6\ Recession_t + \delta_7\ Crisis_t + \xi_s\end{aligned} \tag{2}$$

$$\begin{aligned}\alpha^*_{0,s} = \phi_0 + \phi_1\ \mathrm{ROA}_s + \phi_2\ EquityToAssets_s + \phi_3\ Size_s + \phi_4\ BDivPay_s + \phi_5\ Bankdum_s \\ + \phi_6\ OfferToEquity_s + \phi_7\ Recession_t + \phi_8\ Crisis_t + \Phi' FixedEffects + \varepsilon_s\end{aligned} \tag{3}$$

$$\begin{aligned}\beta^*_{1,s} = \lambda_0 + \lambda_1\ \mathrm{ROA}_s + \lambda_2\ EquityToAssets_s + \lambda_3\ Size_s + \lambda_4\ DivPay_s + \lambda_5\ Bankdum_s \\ + \lambda_6\ OfferToEquity_s + \lambda_7\ Recession_t + \lambda_8\ Crisis_t + \Lambda' FixedEffects + \omega_s\end{aligned} \tag{4}$$

where,

$\alpha^*_{0,s}$ = 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),

$\beta^*_{0,s}$ = post-announcement market beta estimate based on the results from on 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 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),[10]

[10] We do not include this variable in the probit model because it is conditional on a firm's decision to inject capital.

$Recession_t$	=	a dummy variable equal to 1 if the capital injection occurred during a recession (as measured by the NBER business cycle dates), and zero otherwise,
$Crisis_t$	=	a dummy variable equal to 1 if the capital injection occurred during the recent financial crisis, which we consider the period from April 2007 (the failure of subprime lender New Century Financial) to March 2009 (the beginning of the stock market rally), 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, and estimate the models with industry fixed effects (dummy variables for the forty 4-digit SIC codes that represent sub-industries within the SIC financial services category).[11] 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.

[11] 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.

4. Empirical results

4.1. 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.[12] 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. 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-sample includes both firms with competitive and contagion effects, resulting in a zero overall effect.[13]

We find that the market does distinguish between TARP and non-TARP issuances both in terms of direction and magnitude of the effects. Specifically, the cumulative abnormal returns (CARs) for the TARP injections on the issuing firms are positive, rather than negative; and they

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[12] In the 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.

[13] 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.

are larger in magnitude than for non-TARP injections, averaging +99.7 basis points over the 2-day period (t = 0 and t = +1) versus -56.6 basis points 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. The negative effect on the day t−1 for the TARP injections may be due to the unreliability accompanying the leakage of the news and the uncertainty surrounding the actual effects. For TARP events, the effect on the matched non-issuing firms is insignificant for all windows with two exceptions; the pre-announcement day effect 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 indicates the presence of a competitive effect (rivalry), rather than a contagion effect, between the target and matched firms.

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 rapidly incorporating information. The issuing firms' modestly negative immediate CARs and the positive effect from TARP funding reported in Table 1 provide some support for hypothesis H_1. The findings based on the second-stage regressions that use the estimated alphas and betas of issuing and non-issuing firms, reported in Table 3 and discussed in the next section, strengthen the evidence in support of hypothesis H_1.

As noted earlier, our results complement the findings in Gasparro and Pagano (2010) who report insignificant announcement effects for investment by sovereign wealth funds (SWFs) 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. Our results, taken together with the Gasparo-Pagano findings, indicate that the source 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 SWFs, make a capital injection, the net effect can be positive. However, when the investors in a SEO are unable to commit additional resources in the future, the net effect is negative.

4.2 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 estimates of the market model for the full sample of FIs (equations 3-4) 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. These statistics reveal:

(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-issuer firms reveal that prior to the SEO announcements the two groups had statistically similar risk-adjusted excess returns. In terms of magnitude, prior to the announcement, the alphas for the full sample of 358 target FIs averaged −0.7 bps and those of the matching firms averaged to 1.6 bps, but the difference between the two was statistically insignificant. Contrary to this, in the post-event period alphas are dissimilar. Specifically, in the year following the SEOs' announcement, the issuing firms' alpha was, on average, 7.47 bps lower compared to the period prior to the announcement, while the decline in the matched firms

was a much smaller 2.96 bps, and the difference between the two figures was significant at the 5% level. But 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 the full sample (−13.7 versus −7.47 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 is relatively short for mean reversion to materialize or that the turmoil in financial markets over part of our sample period prevented mean reversion from occurring.

(2) *Issuers had greater market betas than non-issuers and the beta gap widened after the SEO capitalization.* The average beta values for issuers and non-issuers for the full sample are 0.81 and 0.72, respectively. The difference between these averages is statistically significant at the 10% level, indicating that issuing firms were riskier prior to their capital injections, relative to the matching firms. In other words, riskier firms chose to raise additional capital. 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, the beta of issuing firms rose by 0.17 (a 21% increase) while the beta of non-issuers rose by 0.11, or 16% (the difference is statistically significant at the 10% level). However, this 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 0.29 (+26%) while non-issuers' betas increased by 0.17 (+20%), with the difference between the two groups being significant at the 5% level. The dissimilar change in betas of the two groups indicates that investors did distinguish between firms that undertook capital injections and those that did not –

TARP-related issuers were perceived as riskier than non-issuers in the post-event period. The fact that the beta of non-issuers also rose indicates that there was some risk-spillover (or contagion) from the issuers to the non-issuers.[14, 15]

(3) *Other differences and similarities in firm characteristics*. According to the difference-in-means tests for the full sample reported in Table 2, the issuer firms are similar to non-issuers in terms of size (total assets and equity market capitalization), profitability (ROA, ROE), growth opportunities (market-to-book value of equity), operational efficiency (overhead expenses to revenue) and liquidity (cash plus marketable securities-to-total assets). The only significant differences are that issuing firms had lower equity capitalization (equity-to-assets = 9.7% compared to 10.8% for non-issuers) and a lower dividend payout ratio (22.7% compared to 29.1% for non-issuers), suggesting that issuers are more highly levered and are more cash-flow-constrained than non-issuers. Both of these factors can serve as driving forces behind the capitalization decision as examined in the next section.

4.3 Probit analysis of the decision to raise additional capital

The estimation results for the probit model of the decision to raise capital are reported in Table 3. Panels A and B display results for the non-TARP and TARP sub-samples, respectively. For the non-TARP events, as might be expected, firms with greater financial leverage (lower equity-to-assets ratio) and tighter financial constraints (lower dividend payout ratio) are more

[14] It is possible that not only the riskiness of the target and matching firms has increased as a result of large capital infusions but the riskiness of the market index itself has increased as well. Our estimates are relative to the risk in the market, so they would not capture this effect.

[15] 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 a decline in risk-adjusted return is more frequent than an increase in the post-announcement period than an increase. The distribution of the estimates of the change in beta is skewed to the right indicating that a rise in beta is more frequent than a decrease in the post-announcement period. 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.

likely to seek a large capital injection. We also find that while larger firms and banks and thrifts were more likely to receive TARP capital injections, they were less likely to raise capital through SEOs in the "normal" pre-TARP period (perhaps necessitating the need for TARP during the crisis period).

4.4 Investor reactions to capital infusions (panel-based tests)

Table 4 presents the results of the panel regressions of Equations (3) and (4) used to test hypotheses $H_3 – H_6$. Panels A and B display the results for issuers and non-issuers for non-TARP events, while Panels C and D display the results for TARP infusions. Our results indicate that in non-TARP issuances, excess return performance (as measured by alpha) is greater if leverage is lower, and the economy is passing through the recession phase of the business cycle (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 other market participants who are not able to raise capital during a weak economy.

The results also show that post-SEO announcement beta values for non-TARP events are higher for firms that are more profitable (ROA), more highly capitalized, and larger, and for those that raised capital during the crisis. This may be because these firms have a greater capacity to absorb risk and may be the only ones able to raise new capital under crisis conditions. Beta values are lower for larger equity issues (*OfferToEquity*) and when the issuance occurred during a non-crisis recession.[16] One explanation for the issue-size effect may be that FIs with

[16] The crisis variable measures the impact of the crisis over and above that of the recession. The total effect is positive.

lower betas can issue larger amounts of equity (reverse causality — i.e., low-beta firms might be more likely to attract larger amounts of capital from risk-averse investors). For the non-issuing firms, too, firm size and the crisis period both have positive effects, while recession and increased dividend payments (signifying a lower cash constraint) are negatively associated with beta. The finding on size is consistent with Berger, Demsetz, and Strahan (1999) who find that larger depository FIs typically have greater incentives to take on risk but are also more exposed to economy-wide systemic risk, and, thus, take on greater systematic risk.

Taken together, our results from Panel A of Table 4 indicate that investors interpret a non-TARP issuance by a more profitable firm as bad news about future financial performance (lower alpha and higher beta). Also, Panels A and B of Table 4 show that issuance during a recession is good news (higher alpha and lower beta) for both issuers and non-issuers, perhaps because only financially strong FIs are able to raise capital during weak economic conditions.

Panels C-D of Table 4 show that results for the TARP injections differ from those of non-TARP events. Specifically, for issuers, the market interpreted the TARP injections as negative news about their future financial performance (lower alpha and higher beta) when the issuers were larger and when the injection occurred in the crisis period (which we defined as April 2007 to March 2009).[17] TARP issuers' betas were also higher when the FI was less cash-constrained and had a bank or thrift charter. For non-issuers, recessionary periods and higher levels of ROA are associated with a negative market reaction, with post-announcement alphas dropping and betas increasing. Overall, these results confirm hypotheses H_2 – H_6 that several factors, both macroeconomic and firm-specific, influence investor reactions to large SEOs by financial institutions.

[17] It should be noted that only 18 of the 127 TARP issuances (14%) occurred outside of the crisis period.

5. Conclusion

This study investigates investors' reactions in the immediate and longer-term to the announcement of secondary equity offerings (SEOs) by financial institutions through private market and TARP funding, how these reactions vary with characteristics of the firms and over the business cycle (including the recent financial crisis), and the determinants of the FI's decision to issue additional equity capital.

We find: (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 these 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 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.

We also find that while larger firms, banks, and thrifts were more likely to receive TARP capital injections, they were less likely to raise capital through SEOs in the "normal" pre-TARP period. This reluctance may have made these types of firms more vulnerable when the financial crisis hit, thereby necessitating a TARP-like program.

(2) Investor reactions to capital injection news are significantly related to the FI's 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, especially during the recent financial crisis. In addition, the alpha estimates

that measure the post-announcement risk-adjusted excess return are lower for smaller and less profitable issuers.

(3) Several firm-specific and economy-wide factors are among the determinants of a firm's decision to issue new capital. For non-TARP offerings, these factors include the FI's equity capitalization, cash constraints, asset size, and FI charter type, while in the case of TARP injections only the latter two factors play a significant role.

(4) Investor reactions to the capital infusions varies with the stage of the business cycle, as well as whether or not the SEOs occurred during the recent financial crisis. For example, equity offerings by FIs during the 2007-2009 crisis were followed by significantly higher systematic risk for both non-TARP and TARP infusions. In addition, the risk-adjusted excess returns for TARP recipients were significantly lower after receiving the TARP funds.

Our results are not only statistically significant but also economically important. For example, assuming a 5% equity risk premium, the average increase of 0.17 in the issuing FI's beta found here in response to (non-TARP) SEO announcements translates into an economically significant 85 basis points rise in the firm's cost of equity capital.

Figure 1. Distribution of SEOs by Industry

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

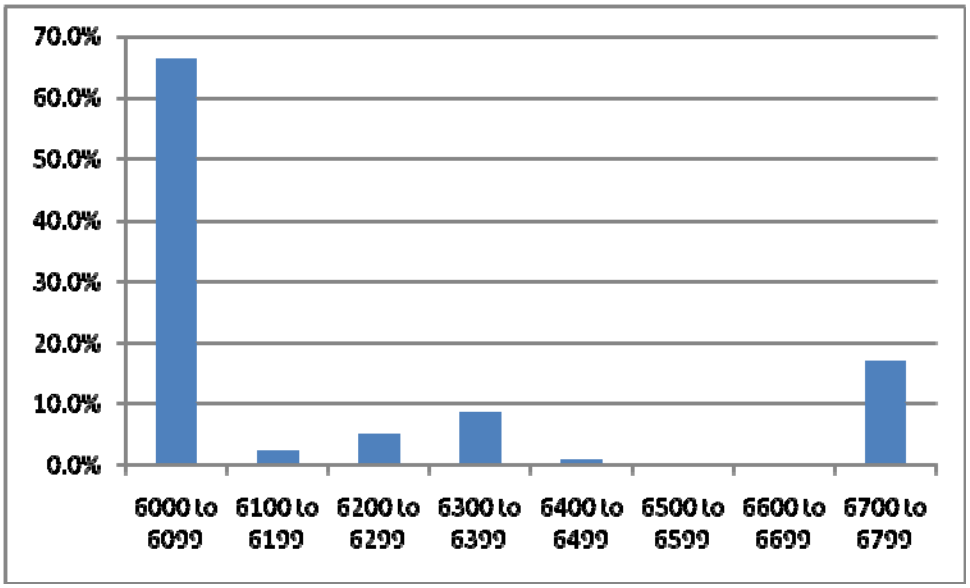

Table 1. Cumulative Abnormal Returns (CARs)

These CAR estimates for Non-TARP and TARP events are based on the Markowitz (1952) model 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).

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 based on standard errors adjusted for autocorrelation and heteroskedasiticity 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 based on standard errors adjusted for autocorrelation and heteroskedasiticity 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 other firm characteristics. The first five variables reported below are used in the time series regressions described by Equation (1) while the next seven variables are used in the cross-sectional analyses described by Equation (2) and reported in Tables 4 and 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	Equation (1) constant	−0.000068	0.002118	358	0.000161	0.001989	358
α_1	Change in alpha	−0.000747 **	0.002991	358	−0.000296 **	0.002907	358
β_0, Beta	Equation (1) slope	0.809203 *	0.742656	358	0.718202 *	0.684693	358
β_1	Change in beta	0.168443 *	0.422296	358	0.111478 *	0.402389	358
Adj. R-squared	For Eq. (1) regressions	0.154676	0.175983	358	0.175111	0.196357	358
	Variables used in Eqs. (2)-(4)						
ROA	Return on Assets	0.004637	0.021596	358	0.007074	0.020219	358
EquityToAssets	Equity Capitalization	0.096516 **	0.069391	358	0.107970 **	0.074738	358
Divpay	Dividend Payout Ratio	0.227084 **	0.391369	358	0.291202 **	0.410367	358
Size	Log of Total Assets	7.660246	1.770453	358	7.534588	1.855462	358
OfferToEquity	SEO Amount / Equity	39.511173	39.336851	358	0.000000	0	358
Recession	Business cycle dummy	0.455307	0.498696	358	0.455307	0.498696	358
Bankdum	Bank/Thrift dummy	0.804469	0.397164	358	0.787709	0.409502	358
ROE	Return on Assets	0.051462	0.517839	352	0.072362	0.313283	352
Cash	Cash + M.S. / Total Assets	0.069628	0.105349	352	0.059279	0.073627	354
M / B ratio	Market-to-Book Equity	1.070080	2.921260	324	1.200670	1.134780	316
Common Equity	Book value of equity	1359.169963	5040.252471	347	2304.327389	9880.088	355
Opaq	Goodwill+Intangibles / Tot. Assets	0.036550	0.111525	322	0.034150	0.093377	310
Mcap	Log of Equity market cap.	5.438074	1.899448	353	5.350288	2.019519	346
Ohead	Tot. Operating Exp. / Revenue	0.733922	0.338603	344	13.052906	0.260429	349
Volume	Trading Volume (shares)	160369193.7	615544745.1	345	0.724906	3.87×10^{8}	349

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	Equation (1) constant	0.000550	0.001550	231	0.000510	0.001490	231
α_1	Change in alpha	-0.000400	0.002210	231	-0.000090	0.002030	231
β_0, Beta	Equation (1) slope	0.636550	0.578970	231	0.645820	0.624930	231
β_1	Change in beta	0.101980	0.383090	231	0.079920	0.404080	231
Adj. R-squared	For Eq. (1) regressions	0.115200 **	0.143820	231	0.143580 **	0.168080	231
	Variables used in Eqs. (2)-(4)						
ROA	Return on Assets	0.007400 **	0.020310	231	0.010880 **	0.017300	358
EquityToAssets	Equity Capitalization	0.095810 ***	0.057740	231	0.109830 ***	0.058860	358
Divpay	Dividend Payout Ratio	0.191800 ***	0.347710	231	0.299220 ***	0.360850	358
Size	Log of Total Assets	7.387690	1.626850	231	7.507960	1.961810	358
OfferToEquity	SEO Amount / Equity	46.103900	47.172560	231	0.000000	0.000000	358
Recession	Business cycle dummy	0.168830	0.375420	231	0.168830	0.375420	358
Bankdum	Bank/Thrift dummy	0.701300	0.458680	231	0.701300	0.458680	358
ROE	Return on Assets	0.080230	0.256140	231	0.119190	0.344710	352
Cash	Cash + M.S. / Total Assets	0.077630	0.120540	231	0.061770	0.077970	354
M / B ratio	Market-to-Book Equity	1.205490	3.492190	219	1.331620	0.67519010	316
Common Equity	Book value of equity	961.275760	2529.033780	231	1773.537420	5675.183640	355
Opaq	Goodwill+Intangibles / Tot. Assets	0.040330 *	0.135650	209	0.022680 *	0.046280	310
Mcap	Log of Equity market cap.	5.453060	1.837160	231	5.658080	2.050080	346
Ohead	Tot. Operating Exp. / Revenue	0.682840	0.349760	228	0.672020	0.272100	349
Volume	Trading Volume (shares)	74713116.77	175195772.3	231	93351634.72	342634185.1	349

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	Equation (1) constant	-0.001200 **	0.002520	127	-0.000470 **	0.002550	127
α_1	Change in alpha	-0.001370	0.003980	127	-0.000670	0.004030	127
β_0, Beta	Equation (1) slope	1.123240 ***	0.892600	127	0.849860 ***	0.767020	127
β_1	Change in beta	0.289340 **	0.463200	127	0.168890 **	0.394410	127
Adj. R-squared	For Eq. (1) regressions	0.226480	0.204800	127	0.232470	0.229210	127
	Variables used in Eqs. (2)-(4)						
ROA	Return on Assets	-0.000380	0.023010	127	0.000140	0.023170	358
EquityToAssets	Equity Capitalization	0.097810	0.086920	127	0.104580	0.097390	358
Divpay	Dividend Payout Ratio	0.291260	0.454800	127	0.276610	0.489000	358
Size	Log of Total Assets	8.156000 ***	1.914680	127	7.583010 ***	1.650860	358
OfferToEquity	SEO Amount / Equity	27.519690	9.883330	127	0.000000	0.000000	358
Recession	Business cycle dummy	0.976380	0.152470	127	0.976380	0.152470	358
Bankdum	Bank/Thrift dummy	0.992130	0.088740	127	0.944880	0.229110	358
ROE	Return on Assets	-0.003460	0.808690	121	-0.017030	0.216910	352
Cash	Cash + M.S. / Total Assets	0.054360	0.065240	121	0.054600	0.064740	354
M / B ratio	Market-to-Book Equity	0.787640	0.906280	105	0.866670	1.811530	316
Common Equity	Book value of equity	2151.528250	7917.702290	116	3293.137740	14805.520060	355
Opaq	Goodwill+Intangibles / Tot. Assets	0.029560 *	0.037390	113	0.055610 *	0.142980	310
Mcap	Log of Equity market cap.	5.409690 ***	2.019630	122	4.785170 ***	1.839980	346
Ohead	Tot. Operating Exp. / Revenue	0.834330	0.291790	116	0.828430	0.199640	349
Volume	Trading Volume (shares)	333935454.9 *	1022539609	114	138974866.8 *	460684683.2	349

Table 3. Probit Model of the Likelihood of a Firm to Receive a Large Capital Infusion

Panels A and B report the results of probit models 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 a probit model based on those large SEOs issued outside of the U.S. government's TARP program. Panel B reports the results based on a sub-sample of TARP recipients. 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	1.3395***	0.4468	8.99	0.0027	−2.5762***	0.9272	7.72	0.0055
ROA	−1.8926	3.484	0.30	0.5870	0.1016	4.3578	0.00	0.9814
EquityToAssets	−3.7288***	1.2855	8.41	0.0037	−0.2601	1.1091	0.06	0.8146
Recession	−0.0385	0.1874	0.04	0.8374	0.385	0.5573	0.48	0.4896
Size	−0.0737*	0.0394	3.49	0.0616	0.1368***	0.0470	8.48	0.0036
Divpay	−0.4699***	0.1723	7.44	0.0064	0.0523	0.1745	0.09	0.7643
Bankdum	−0.3986*	0.1749	5.19	0.0227	1.4778**	0.6066	5.94	0.0148
Crisis	0.1027	0.231	0.20	0.6566	−0.3519	0.2573	1.87	0.1713
No. obs.	462				254			

Table 4. Second-Stage Panel Regression Analysis based on Capital Issuance: Basic and Fixed Effects Models

Panel regressions with and without fixed effects are estimated for the full, pooled sample and sub-samples. These sub-samples are split evenly between firms issuing large capital offerings (10% or more of existing common equity), *Issuing Firms*, and those that did not issue equity, *Non-Issuing Firms*. 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. Issuers: Non-TARP events				**Panel C. Issuers: TARP events**			
Dependent Var.	**Alpha**		**Beta**		**Alpha**		**Beta**	
Independent Var.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.
Intercept	0.000731	0.62	−0.91215***	−3.62	0.006324***	4.22	−0.28032	−0.47
ROA	−0.01064***	−14.21	3.368662***	2.61	0.002368	0.24	−0.7552	−0.25
EquityToAssets	−0.00101	−0.28	1.981259***	3.19	−0.00137	−0.73	0.029851	0.03
OfferToEquity	−1.7E−06	−0.57	−0.00105**	−2.53	3.29E−05***	6.54	−0.00416	−0.92
Recession	0.00111**	2.10	−0.17466**	−2.56	−0.00343***	−9.75	0.120559	0.89
Size	−6.8E−05	−0.49	0.22083***	6.96	−0.00014*	−1.73	0.126309***	4.50
Divpay	−0.00027	−0.51	−0.08808	−0.75	−0.00033	−0.89	0.228546***	3.17
Bankdum	−0.00047	−0.90	0.058459	0.34	−0.00103*	−1.68	0.503832***	3.32
Crisis	0.000265	0.43	0.385921***	2.89	−0.00112***	−3.73	0.226855*	1.96
Fixed Effects?	Yes		Yes		Yes		Yes	
No. Obs.	231		231		127		127	
Adjusted R^2	0.1175		0.6170		0.1955		0.1776	

	Panel B. Non-Issuers: Non-TARP events				**Panel D. Non-Issuers: TARP events**			
Dependent Var.	**Alpha**		**Beta**		**Alpha**		**Beta**	
Independent Var.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.	Parameter	t-stat.
Intercept	−0.00076	−0.77	−0.19267	−0.60	−0.00066	−0.15	2.307942***	18.63
ROA	0.000491	0.15	2.032099	1.10	−0.00413	−0.32	5.311754***	4.63
EquityToAssets	0.002752**	2.47	−0.34241	−0.38	0.003462	0.62	−3.72249***	−5.43
Recession	0.000678**	2.41	−0.23729**	−2.10	−0.00102***	−5.30	0.499459***	3.39
Size	-2.6×10^{-6}	−0.03	0.168427***	5.66	-9.5×10^{-5}	−1.37	0.045282*	1.70
Divpay	0.000334	0.92	−0.21361*	−1.90	−0.0007***	−2.92	0.200241	0.77
Bankdum	0.001166	0.94	0.179298	0.73	0.002242	0.76	−1.23557	−2.50
Crisis	0.001101***	3.21	0.664506***	3.18	8.79×10^{-5}	0.29	−0.09705	−0.68
Fixed Effects?	Yes		Yes		Yes		Yes	
No. Obs.	231		231		127		127	
Adjusted R^2	0.0703		0.5180		0.0184		0.0819	

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