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PII: S0378-4266(18)30143-2
DOI: 10.1016/j.jbankfin.2018.07.001
Reference: JBF 5377

To appear in: *Journal of Banking and Finance*

Received date: 19 November 2017
Revised date: 16 June 2018
Accepted date: 5 July 2018

Please cite this article as: Elena Beccalli , Pascal Frantz , Francesca Lenoci , Hidden effects of bank recapitalizations, *Journal of Banking and Finance* (2018), doi: 10.1016/j.jbankfin.2018.07.001

Hidden effects of bank recapitalizations

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Abstract

Given the importance of capital regulation in the banking industry, how and why a bank's behavior reacts to a recapitalization has profound consequences. To this end, we investigate the effects of 306 seasoned equity offerings (SEOs) conducted by listed European banks between 2002 and 2014. We use propensity score matching and find that SEOs lead to asset expansion as opposed to any deleveraging. Further, we find a decrease in lending in the short-term followed by a subsequent increase, a reduction in profitability, and an increase in systemic risk. Regulators might not have fully considered this last negative externality when they imposed the tougher Basel III capital requirements. The effects of SEOs strongly depend on the reasons behind the recapitalizations.

JEL classification code: G21, G34

Keywords: Banks; Recapitalizations; SEOs; EU; Systemic risk; SIFI; Deleveraging; Lending; Profitability.

We wish to thank Piergiorgio Alessandri, Antonio Bayeh, Thorsten Beck, Ettore Croci, Angela Gallo, Zhongwei Huang, Maria Chiara Iannino, Vlado Kysucky, Philip Molyneux, and Joshua Ronen for their comments. We also acknowledge the helpful comments by participants at the European Financial Management Association Annual Meeting (Basel, 2016), the Fifth Emerging Scholars in Banking and Finance (London, 2016), the Paris Financial Management Conference (Paris, 2016), the Workshop in Econometrics and Empirical Economics (Perugia, 2016), the International Finance and Banking Society Conference (Oxford, 2017), the Wolpertinger Conference (Santander, 2017), the Conference on Contemporary Issues in Banking (St Andrews, 2017), at the Bank of Italy seminar series (Rome, 2018)., at the Macro-Prudential Policy and Financial Stability seminar at European Central Bank (Frankfurt, 2018).

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1. Introduction

After the recent financial crisis, regulators as well as governments now believe that higher capitalization makes banks sounder and more resilient (Basel Committee on Banking Supervision, 2009, 2010). Thus, Basel III imposes higher capital requirements. Corporate finance theory argues that a bank has disincentives to raise equity in the stock market (Jensen and Meckling, 1976; Myers, 1977; Myers and Majluf, 1984; Kashyap et al., 2008), but bank regulators believe that by having higher capital levels, a bank can reduce its insolvency risk (i.e., enhancement of banks' survival probabilities) and can increase its loss absorbance capacity (Berger and Bouwman, 2013; Flannery, 2014; Berger et al., 2016). However, the empirical literature on the effects of a recapitalization on a bank's behavior is very limited. As a result, the net impact of recapitalizations remains ambiguous. Therefore, we investigate the existence of hidden effects associated with banks' seasoned equity offerings (SEOs), defined as a common stock issue at the pricing date of the issue.

Banks can use SEOs not only to meet higher capital requirements but also to expand assets or deleverage, and to change the composition of their asset portfolios. Moreover, SEOs might lead to unintended effects on profitability and systemic risk. Because the regulators and supervisors put strong pressure on banks to strengthen their capital, an investigation of the hidden effects of SEOs in the medium term becomes relevant. The research questions addressed in this paper are as follows: (i) Do SEOs lead to asset expansion or do they lead to deleveraging? (ii) Do SEOs lead to changes in lending or in asset composition? (iii) Do SEOs lead to changes in profitability? And (iv) Do SEOs lead to changes in systemic risk?

Research question (i) has its economic motivation in the fact that shareholders pervasively resist leverage-reducing recapitalitazions no matter how much such reductions might enhance the firm's value (Admati et al., 2013; Admati et al., 2018). These asymmetric forces behind leverage adjustments, which Admati et al. (2018) named the *leverage ratchet effect*, motivate our decision to test whether banks recapitalize to expand their assets or to reduce their leverage.

Relatedly, question (ii) examines how a bank implements its asset expansion. Several economic motivations support the *lending dominating effect*: capital increases banks' ability to lend because of regulatory capital requirements (Gambacorta and Mistrulli, 2004), safer banks attract more deposits that enhances their ability to provide lending (Gambacorta and Mistrulli, 2004), and recapitalizations reduce the magnitude of the banks' debt overhang problems (Myers, 1977). However, the effect on lending is conditional on the magnitude of the recapitalization (Bhattacharya and Nyborg, 2013; Philippon and Schnabl, 2013), the banks' current capital position (Gambacorta and Mistrulli, 2004; Inderst and Muller, 2008; Brei et al., 2013), their liquidity position (Kim and Sohn, 2017), and their profitability level (Cohen and Scatigna, 2016). Therefore, we test whether banks use recapitalizations to increase lending when they expand their assets.

Research question (iii) examines how recapitalizations affect profitability. Several economic reasons support a decrease in profitability: bank managers might require a longer time to identify suitable borrowers, strategically time their SEOs (Loughran and Ritter, 1997), boost accruals in the SEO years (Sloan, 1996; Teoh, Welch and Wong, 1998), or they might decrease leverage; all of which can lead to lower risk and hence lower expected profitability (Berger, 1995). Therefore, we investigate whether this managerial behavior leads to recapitalizations that decrease profitability.

Research question (iv) broadens the analysis to the overall banking industry by investigating systemic risk. Recapitalizations affect systemic risk in two different ways: a balance-sheet effect and a market-return effect. The former effect might reduce systemic risk as long as recapitalizations reduce leverage, while the latter might increase systemic risk because of the negative signal that recapitalizations can send (Myers and Majluf, 1984). This signal was especially relevant during the global financial crisis when it resulted in a loss of confidence in the market (Claessens et al., 2010).

We therefore contribute to the ongoing capital debate by investigating *how* and *why* a bank's behavior reacts to recapitalizations. Specifically, we assess the extent to which the recapitalizations of listed European banks led to a growth in assets, deleveraging, changes in asset composition, and changes in profitability and systemic risk in the run-up to the crisis and during the crisis. To this end,

we estimate the effects of recapitalizations on a number of bank indicators: (i) asset growth (Δ*(TA)*) and deleveraging (Δ*(Lev)*), (ii) lending policies (*Loans*, *Loan Reserves, Write-offs*), (iii) profitability measures (*ROA, Profitability of lending*), and (iv) systemic riskiness (*SRISK, SIFI* - systemically important financial institution) in the period from one to three years after the SEO. Furthermore, to account for different reasons behind SEOs, we investigate the effects of five types: SEOs to strengthen capital ratios, to absorb nonperforming loans, to address market underpricing, to follow up state interventions, and to take the opportunity to expand assets.

An important issue that arises when attempting to estimate the effect of a recapitalization on a bank's behavior is that the choice to undertake a SEO is endogenous; that is, a bank determines whether it wants to recapitalize and when.[1] To address the self-selection issue in this endogenous decision, we apply a propensity score matching (PSM) approach. Further, we use instrumental variables (IVs) as a robustness test. To our knowledge, prior research has not applied the PSM to investigate SEOs, and thus this approach represents the key methodological contribution of our paper. Specifically, we estimate the recapitalization effect on the change in the output of banks measured as the difference in outcomes before and after SEOs.

Our results highlight the following effects of bank recapitalizations. First, SEOs lead to asset expansion and not to deleveraging, Second, SEOs reduce lending and increase loan reserves and write-offs in the year following the recapitalization. The decrease in lending in the first year after a recapitalization is however followed by increases in the second and third year. Alternative uses of the proceeds from recapitalizations (such as credit risk management via increases in loan reserves and write-offs) thus prevail in the short term but not in the medium term. Third, SEOs reduce profitability in the three years following the recapitalizations. Fourth, SEOs increase systemic risk and the likelihood of achieving SIFI *status* over the three years following the recapitalizations.

[1] We are also aware that some recapitalizations are forced. However, for European banks the distinction between forced and recommended recapitalizations is not unambiguous, and also data on forced recapitalizations are not available. Therefore, we conduct our analysis as if all recapitalizations are endogenous. Furthermore, in a separate analysis on the reasons for SEOs, we consider state interventions as a proxy for forced recapitalizations.

The decrease in lending in the year following recapitalizations means that banks do not use the full proceeds to provide loans. Alternative uses of the proceeds hence prevail in the short term. One alternative use for the proceeds is the increase in loan reserves, which is confirmed by our empirical evidence. Banks need to raise capital to be able to put aside higher loan reserves to offset the write-offs of bad loans. These reserves might explain the decrease in *ROA* in the first year after the SEO. The decrease might be caused by larger write-offs made possible by the higher loan reserves created thanks to the proceeds of the recapitalizations.

The increase in systemic risk and the increase in the likelihood of achieving SIFI status in the three years following recapitalizations highlight the presence of hidden effects that are persistent over time. The fact that recapitalizations increase the contribution of banks to systemic risk means that banks engaging in SEOs become not only the biggest losers in a crisis but also the biggest contributors to the crisis. This evidence is reinforced by our finding that SEOs have a positive effect on the likelihood of achieving the SIFI status: by raising more capital, banks increase their size and hence receive the hidden benefit of reaching a size that guarantees state protection especially during the crisis (Laeven et al., 2014). Regulators mitght not have filly accounted for this negative externality of recapitalizations when imposing tougher capital requirements.

Finally, because of the different reasons behind SEOs, we investigate the effects of SEOs in several circumstances. First, low capitalized banks need SEOs to strengthen their capital ratios that actually positively affects their equity levels, while well-capitalized banks use SEOs for different reasons (such as increases in write-offs and loan loss provisions). Second, banks with more nonperforming loans use SEOs to write off bad loans and to absorb losses on loans, while banks with less nonperforming loans use SEOs to enable bank managers to increase the credit supply that has positive effects on the real economy. Third, for banks that are underpriced in the market (i.e., lower price-to-book, PB ratio), SEOs do not improve performance but instead allow a bank to manage its credit risk via write-offs and loan reserves. The effects of SEOs on systemic risk differ widely between lower and higher PB banks: for underpriced banks SEOs determine an increase in systemic

risk, whereas the opposite occurs for overpriced banks. Fourth, for banks that go through state interventions (state recapitalizations and state guarantees), the subsequent SEOs not only increase profitability but also reduce systemic risk and hence support the view on the stabilizing role of public ownership. Finally, banks use SEOs to expand their asset portfolio independently of their past growth, that is, SEOs lead to asset expansion for both banks with high ex-ante growth and for banks with low ex-ante growth.

Section 2 develops the model that identifies the accounting relations that motivate the analysis and lead to our hypotheses. Section 3 describes the sample and the data sources. Section 4 explains the methodology. Section 5 discusses the empirical evidence and robustness tests. And, section 6 provides a conclusion.

2. Model specification

A large and growing literature on banking focuses either on the effects of capital or on its determinants. This literature investigates the effects of the variations in capital (recapitalizations) on market performance, and the effects of the level of regulatory capital on banks' performance and lending. Nonetheless, banks meet higher capital requirements either by increasing equity (recapitalizations) or by reducing assets and lending to risky borrowers in order to reduce risk weighted assets (Hyun and Rhee, 2011). Therefore, the studies on the level of capital do not necessarily investigate the effects of recapitalizations but might instead capture the effects of the changes in the assets and risk. Thus, in this paper we aim to focus on the effects specifically attributable to recapitalizations.

In this section, we develop testable hypotheses for banks' behavior in relation to asset expansion, deleveraging, asset composition, profitability, and systemic risk.

Asset expansion versus deleveraging. Banks might use recapitalizations to generate growth in their assets or to reduce leverage. Formally, the proceeds from recapitalizations ($SEO_{i,t}^{k}$)[2] that are scaled by total assets ($A_{i,t}$) are equal to the proportional change in total assets ($\frac{\Delta A_{i,t+1}}{A_{i,t}}$) minus the change in debt deflated by total assets ($\frac{\Delta D_{i,t+1}}{A_{i,t}}$):

$$SEO_{i,t+1}^{k} = \Delta A_{i,t+1} - \Delta D_{i,t+1} \quad (1)$$

$$\frac{SEO_{i,t+1}^{k}}{A_{i,t}} = \frac{\Delta A_{i,t+1}}{A_{i,t}} - \frac{\Delta D_{i,t+1}}{A_{i,t}} \quad (2)$$

Equation (2) shows the potential consequences that would result from increasing equity. SEOs either lead to asset expansion (i.e., SEOs for asset growth) or they lead to deleveraging (i.e., SEOs for liability composition).

In a general theoretical setting, Admati et al. (2018) show that shareholders are always harmed by leverage-reducing recapitalizations. They show that shareholders are strictly worse off when issuing securities to recapitalize the firm and reduce its outstanding debt. Similarly, in a banking model, Admati et al. (2013) show that banks are inclined to asset-expansion recapitalizations. They find that shareholders resist any degree of leverage reduction, no matter how inefficient the firm's current level of leverage.

Collectively, we introduce hypothesis 1 on asset expansion versus deleveraging:

H_A: SEOs are primarily for asset expansion not for deleveraging.

Asset composition. In terms of simple financial statement mechanics, $\Delta A_{i,t+1} = \Delta Loans_{i,t+1} + \Delta Other\ assets_{i,t+1}$. Therefore:

$$\frac{\Delta A_{i,t+1}}{A_{i,t}} = [(l_{i,t+1} - l_{i,t}) + (\gamma_{i,t+1} - \gamma_{i,t})] > 0 \quad (3)$$

where $l_{i,t+1}$ denotes the ratio of loans to assets at the end of the year, $l_{i,t}$ the ratio of loans to assets at the beginning of the year, and $\gamma_{i,t+1}$ and $\gamma_{i,t}$ denote the ratios of other assets to total assets at the end

[2] Where $SEO_{i,t+1}^{k}$ denotes the value, the $SEO_{i,t+1}$ denotes a dummy variable that equals one for a bank recapitalization.

and at the beginning of the year respectively. That is, we can decompose the bank's growth of assets into changes in their loans and other earnings assets. Thus, when the bank increases its assets ($\frac{\Delta A_{i,t+1}}{A_{i,t}} > 0$), such growth can be driven either by lending expansion (when $l_{i,t+1} - l_{i,t} > 0$) or by a change in the asset composition (when $\gamma_{i,t+1} - \gamma_{i,t} > l_{i,t+1} - l_{i,t}$).

Recapitalizations should lead to increases in lending (that is the most relevant component of total asset, accounting for about 55% in our sample) for a number of reasons. First, capital enhances the capacity to increase an insured form of debt (safer banks attract more deposits), and therefore a bank's ability to limit the effects of a drop in lending (Gambacorta and Mistrulli, 2004). Second, given that regulatory capital requirements depend on the amount of loans granted, capital increases a bank's ability to lend (Gambacorta and Mistrulli, 2004), although under the additional assumption that banks face an imperfect market for their equities (Myers and Majluf, 1984; Cornett and Tehranian, 1994; Calomiris and Hubbard, 1995; Stein, 1998). The real effect of an increase in capital depends on the size of the recapitalizations, the bank's ex-post ability to meet the capital requirements, and the quality of the banks' clients (Giannetti and Simonov, 2013). Recapitalizations translate into greater loans provided that the capital ratio is above a certain threshold (Brei et al., 2013), liquidity is high (Kim and Sohn, 2017), and profitability is high (Cohen and Scatigna, 2016). Third, a bank's recapitalization can lead to an increase in lending by reducing the magnitude of the bank's debt overhang (Myers, 1977). Nevertheless, in order to be effective, recapitalizations have to be sufficiently large (Bhattacharya and Nyborg, 2013; Philippon and Schnabl, 2013), otherwise they are ineffective in spurring lending.

Nonetheless, the impact of recapitalization on lending depends on the bank's current capital position (Gambacorta and Mistrulli, 2004; Inderst and Mueller, 2008). If a bank is well-capitalized, a reduction in capital does not have to coincide with a reduction in assets. On the contrary, if a bank has less capital, then it has to actively manage its assets in order to maintain constant leverage (so-called leverage targeting in Adrian and Shin, 2010) to avoid violating the capital requirements. For such a

bank, the impact of a recapitalization on lending should be greater than for its well-capitalized counterparts. At odds with the idea that leverage invariably leads to excessive risk taking, Inderst and Mueller (2008) argue that banks must be sufficiently levered to have first-best incentives to make new risky loans.

Collectively, we introduce hypothesis 2 on asset composition:

H_A: SEOs lead to increases in lending when they are for asset expansion.

Profitability. Denoting $ROA_{i,t} = \frac{OI_{i,t}}{A_{i,t}}$ (where $OI_{i.t}$ equals operating income), it follows that:

$$ROA_{i,t+1} = \frac{OI_{i,t+1}}{A_{i,t+1}} = [ROEA_{i,t+1} + \frac{\Delta A_{i,t+1}}{A_{i,t}}\left(ROIA_{i,t+1} - ROEA_{i,t+1}\right)]\frac{A_{i,t}}{A_{i,t+1}} \qquad (4)$$

with $ROEA_{i,t+1}$ denoting the return on assets existing at the date *t* generated at date *t+1,* $ROIA_{i,t+1}$ denoting the return on *incremental* assets invested in at date *t* generated at date *t+1,* $\Delta A_{i,t+1} = A_{i,t+1} - A_{i,t}$ (with $\Delta A_{i,t+1} > 0$), *t* being the date of the SEO. When SEOs are for asset expansion ($\Delta A_{i,t+1} > 0$), they hence increase the banks' ROA in the subsequent year if they lead to investment in assets that generate a return in excess of the return on existing assets prior to the SEOs. Conversely, SEOs decrease the banks' ROA in the subsequent year if they lead to an investment in assets that generate a return lower than the return on existing assets prior to the SEOs.

Recapitalizations should lead to decreases in profitability for the following reasons. First, banks might need time to identify suitable borrowers, and lending tends to be more profitable than investing in securities. Second, banks might time their SEOs and raise capital when performance tends to be at its peak (Loughran and Ritter, 1997). Third, bank managers working on behalf of their existing shareholders have incentives to boost accruals in the SEO years (Sloan, 1996; Teoh, Welch and Wong, 1998). Fourth, recapitalizations might decrease leverage that leads to lower risk and hence lower expected profitability in both the short and medium term (Berger, 1995).

Collectively, we introduce hypothesis 3 on profitability:

H_A: SEOs lead to decreases in profitability when they are for asset expansion.

Systemic risk. Our systemic risk variable is SRISK as it combines the shock on the balance-sheet component and the shock on the market-return component.[3] As in Brownlees and Engle (2012, 2016) and Acharya, Engle and Richardson (2012), SRISK measures the expected capital shortage faced by a bank during a system's distress when the market declines substantially. Formally:

$$SRISK_{i,t} = kD_{i,t} - (1-k)W_{i,t}\left[1 - LRMES_{i,t+h|t}\right] \quad (5)$$

where k is the minimum fraction of capital that is expressed as the ratio of total assets that each bank needs to hold; $D_{i,t}$ and $W_{i,t}$ are the book value of debt and the market value of equity of bank i in period t; and $LRMES_{i,t+h|t}$ is the long-run marginal expected shortfall of bank i that is conditional on a market's distress (i.e., a decline below threshold $C_{t+h|t}$). Denoting $D_{i,t} = W_{i,t}(LEV_{i,t} - 1)$ and substituting it in to equation (5), the equation becomes:

$$SRISK_{i,t} = W_{i,t}[kLEV_{i,t} + (1-k)LRMES_{i,t+h|t} - 1] \quad (6)$$

From equation (6), we know that SRISK increases with leverage ($LEV_{i,t}$, balance sheet component) and with the long-run marginal expected shortfall ($LRMES_{i,t+h|t}$, market-return component) and that SRISK decreases with the market value of equity ($W_{i,t}$).

When we introduce SEOs, the balance-sheet and market-return components determine their effect on SRISK. As for the balance-sheet component (LEV), given that SEOs reduce leverage ceteris paribus and that leverage increases SRISK, thus SEOs reduce systemic risk. This is in line with the effect expected by regulators—recapitalizations make banks more resilient (skin in the game effect). As for the market-return component (LRMES), given that SEOs increase LRMES ceteris paribus and that LRMES increases SRISK, SEOs increase systemic risk. SEOs increase LRMES because of the adverse selection problem associated with SEOs. Myers and Majluf (1984) were the first to note that SEO announcements might send a negative signal about the bank's future prospects. Because of the informational asymmetry between insiders and investors, there is a negative market reaction and the

[3] As explained in the robustness section, we also employ ΔCoVaR as a proxy for systemic risk.

new equity issues are underpriced. This was especially true during the global financial crisis, when recapitalizations of European commercial banks resulted in a loss of confidence in the market (Claessens et al., 2010). Therefore, SEOs might have a negative signaling effect and thus increase the banks' expected losses; it follows that SEOs increase systemic risk, which is a hidden effect of recapitalizations. Therefore, the net effect of SEOs on SRISK is positive when its effect on LRMES is greater than the one on LEV.

Collectively, we introduce hypothesis 4 on systemic risk:

H_A: SEOs lead to increases in systemic risk when their effect on the market-return component is larger than their effect on the balance-sheet component.

3. Data set and sample

The cross-country panel data set used in this analysis is obtained by combining five sources: Thomson One Banker for information on SEOs, Bankscope (Bureau Van Dijk) for information on the consolidated financial statements, Datastream and Bloomberg for market variables, V-Lab for the systemic risk measure, and the lists published by the Financial Stability Board and the Basel Committee on Banking Supervision for the SIFI status. The financial statement variables are winsorized at the top and bottom 5% of the distribution of each variable.

We investigate SEOs conducted by European listed banks that occurred between January 2002 and December 2014. We also distinguish two subperiods (non-crisis: 2002-2006 and 2011-2014; and crisis 2007-2010).[4]

The SEO, as provided by Thomson One, constitutes our treatment variable. SEO is defined as a common stock issue at the pricing date of the issue (that is, an equity issuance involving new common stocks, which is dilutive);[5] all the offers that meet Thomson Reuters' standard criteria are included.

[4] As robustness tests, we use two other definitions of the crisis.

[5] We exclude right offers, private placement (Rule 144), and unit offerings. We also exclude pure secondary offers that are SEOs based on the exchange of existing shares without any impact on the level of total common equity in the bank. Finally, we exclude equity offers that have been withdrawn after their announcement and, hence, do not produce any effect

We first use the "New Issue" database to generate the initial sample of fully marketed SEOs over the 2002 to 2014 period. The initial screen excludes offers below EUR25 million. We include institutions where the primary SIC code description is made up by banks and credit institutions. In our final sample the number of SEOs is 306 for a total number of 497 bank-year observations.[6] Table 1 reports the distribution of the 306 SEOs. The control sample consists of banks that have never engaged in any SEO operation that consists of 6,155 observations over the sample period. We also use a subsample of SEOs after state interventions that we use as a proxy for forced recapitalizations. This subsample comprise 33 state recapitalizations and 46 state guarantees interventions. According to the European Central Bank, we define public recapitalizations as government purchases of participation capital securities such as equities and guarantees (Petrovic and Tutsch, 2009).

To investigate the effects of recapitalizations, we use several alternative dependent variables that we group into four categories: asset growth and deleveraging (Δ*(TA)* and Δ*(Lev)*), lending policies (*Loans*, *Loan Reserves,* and *Write-offs*), profitability measures (*ROA* and *Profitability of lending*), and systemic riskiness (*SRISK* and *SIFI*). The dependent variables' definitions are given in Table 2 (Panel A) and their summary statistics are reported in Table 3 (Panels A and B). *Asset growth* measures the asset expansion of the bank. *Deleveraging* indicates a reduction in leverage for negative values. *Loans* measures the degree of specialization in the lending activity of the bank. *Loan Reserves* gives is a proxy for the magnitude of precautionary measures taken by a bank for its loan portfolio's credit risk. *Write-offs* are defined as impairment losses incurred from lending to costumers plus provisions for losses expected on loans and advances. *ROA* measures the efficiency of the business in using its assets to generate net income. *Profitability of lending* measures the proportion of income generated by lending with respect to all earning assets. Formally, it represents the average rate of interest the bank is charging on its loans. *SRISK,* measured as in Acharya et al. (2012)*,* is the propensity of a firm to

on the bank's capital structure. Therefore, we consider the most common new equity issuance method for capital injections from external sources.

[6] When the dependent variable is systemic risk, the total number of recapitalized banks reduces to 210 because V-Lab computes the variable for a subsample of banks. Similarly, when the dependent variable is SIFI, the number of recapitalized banks reduces to 25 because the list published by FSB and BCBS comprises a subsample of banks.

be under-capitalized when the financial system as a whole is under-capitalized, that is, in case of a new financial crisis. A bank is said to be under-capitalized (or in financial stress) if its equity falls below a given fraction *k* of its assets. The parameter *k* is defined as a prudential ratio that is typically set by the regulator.[7] SIFI is defined as a time-varying dummy variable equal to one when the bank is included in the lists published by the Financial Stability Board (FSB) and the Basel Committee on Banking Supervision (BCBS) of the systemically important global banks. The variable is a dummy equal to one in the year in which the SIFI status is acquired and in the following years until the same bank is removed from the list, and zero otherwise. Our sample comprises 14 SIFIs per year in 2012, 2013, and 2014 (13 in 2011).

We control for several bank, market, and macro variables. The control variables' definitions are given in Table 2 (Panel B) and their summary statistics are reported in Table 3 (Panels C and D). The set of control variables is selected to account for the dimensions that the literature considers relevant for lending policies, profitability, and systemic riskiness; and the same set is used for all the dependent variable specifications.

First, we control for bank-specific accounting variables (*Size, Equity, Liquidity, NIM,* and *CTI*). *Size*, via economies of scale, is extensively considered to affect profitability, typically in a positive way (Smirlock, 1985; Goddard et al., 2004). Also, size is expected to positively affect systemic risk because large banks can respond to too-big-to-fail subsidies and can suffer from bad corporate governance (Black et al., 2013; Laeven et al., 2014). In what concerns the relation between size and lending, the literature finds a negative association because larger banks are more devoted to ancillary activities than smaller banks due to their ability to amortize the costs of being involved in different activities (Berrospide and Edge, 2010).

[7] According to Acharya et al. (2012), $SRISK\%_{i,t}$ is the contribution to aggregate SRISK by any bank. To calculate systemic risk, the procedure first evaluates the losses that an equity holder would face if there were a crisis (i.e., whenever the broad index falls by 40% over the next six months). For crisis scenarios, the expected loss of equity value of firm *i* is called the long-run marginal expected shortfall (LRMES), that is, the average of the fractional returns of the firm's equity. The capital shortfall can be directly computed by recognizing that the book value of debt remains relatively unchanged during this six-month period while equity values fall by LRMES.

The risk-taking of the banks is tested by their insolvency risk (represented by the amount of tangible equity over total assets, *Equity*); higher values of equity indicate lower insolvency risk as in Rochet (1999). Equity's effect on banks' profitability is a priori ambiguous. On the one hand, the conventional risk-return hypothesis argues for a negative relation (the higher the bank's capitalization and its solvency, the safer the bank and the lower the expected return). On the other hand, higher capital, and thus lower risk, should increase a bank's creditworthiness and reduce its funding cost (Iannotta et al., 2007; Dietrich and Wanzenried, 2014). The effect of equity on systemic risk should be positive (Black et al., 2013) because of the risk-taking incentives (as in Perotti et al., 2011); that is, more capitalized banks, potentially through regulatory requirements, have incentives to take on tail risks that lead to an increased systemic contribution when these risks are realized. Little evidence exists on the effect of a bank's capital ratio on its lending, but such an effect tends to be negative (Lown and Morgan, 2006).

Liquidity represents the percentage of total investments that is promptly converted into cash. As for liquidity, some studies find a negative relation with profitability (Molyneux and Thornton, 1992), while others either report a positive relation (Bourke, 1989) or no relation (Iannotta et al., 2007). We expect a negative relation between systemic risk and liquid assets because the higher the liquid resources of a bank the greater the probability of coping with losses in the short term. The effect of liquid assets on bank's loans is well documented by Kashyap and Stein (2000), who report a negative relation between the presence of short-term assets and loans provided by the bank.

The efficiency in the management of the bank is tested by the profitability of the banking activities (*NIM*) and the cost-to-income ratio (*CTI*). *NIM* represents a measure of the profitability of the traditional banking activity. The margins in lending are usually higher than the margins from investments in securities, therefore we expect banks with a higher net interest margin to their total loans to be more profitable. This is due, for example, to the higher bargaining power of banks in providing loans (Holmstrom and Tirole, 1997). However, the recent empirical evidence finds the opposite relation (Dietrich and Wanzenried, 2014). Thus, whether banks with an income

diversification strategy are more or less profitable is an empirical question that needs to be answered. We expect a positive coefficient for the relation between *NIM* and the specialization in the lending activity (Demirguç-Kunt and Huizinga, 1999). The empirical evidence on systemic risk instead shows a positive relation with market-based activities (and thus a negative relation with NIM) where banks contribute more to systemic risk when they engage more in market-based activities and thus are more diversified (Laeven et al., 2014). *CTI* provides a measure of how efficiently a bank is being run: the lower it is the better. An extensive banking literature (Bourke, 1989; Molyneux and Thornton, 1992) finds a positive relation between better quality management and profitability. As documented by Pastor and Serrano (2006), cost inefficiency is positively related with specialization in lending. To the best of our knowledge, there is no evidence on the effects of efficiency on systemic risk.

Second, we control for bank-specific market variables. The first variable is the relative price-to-book ratio (*PB ratio*). This measure captures the value of banks' rents in the banking market (Dinger and Vallascas, 2015), thus we expect the *PB ratio* to be positively correlated with profitability. To the best of our knowledge, the relation between the specialization in banking and the PB ratio is not deeply investigated; Strahan (1999) proves that lines of credit increase when there is an increase in the market-to-book asset ratio. The expected relation between the PB ratio and systemic risk fluctuates over time (Black et al., 2013); the relation should be positive when the traditional corporate finance risk-return view prevails, while it should be negative if negative market expectations determine a reduction in share prices and thus higher systemic risk. Price volatility (*Price Vol.*) is a market-based measure of the risk of the bank. The evidence that refers to the overall market volatility shows a positive relation with systemic risk (Laeven et al., 2014). The third variable aims at capturing the life-cycle effects on the decision to issue equity that is represented (as in Dinger and Vallascas, 2015) by the number of years a bank is listed on the stock market (*Year listed*). Given that younger banks tend to rely more on equity issues in order to support their growing investment opportunities (DeAngelo et al., 2010) and that we have no unambiguous prediction about the relation between equity and profitability, we do not have an a priori expectation for *Year listed*. However, we have no expectation

on the link between the specialization in banking or systemic risk and the number of years the bank is listed on the stock market.

Third, we control for macroeconomic variables. Specifically, we select the regulatory quality (*Reg. Quality*) of the country where each bank operates (as performed by Demirguç-Kunt and Huizinga, 1999, for profitability), and the level of GDP growth (*GDP Growth*) of each country (as performed by Goddard et al., 2011, and Dietrich and Wanzenried, 2014, for profitability).

4. Methodology

4.1 The baseline regression analysis

To estimate the effect of SEOs on the behavior of banks, we use a baseline fixed-effect (FE) model.[8] To account for the variance not being homogenous in the sample (i.e., presence of within-subject variability), we run three FE models that represent country, business model, and year as:

$$Y_{i,t+1} = \alpha + \delta_i + \gamma(SEO_{i,t}) + \beta(\boldsymbol{X_{i,t}}) + \mathcal{E}_{i,t} \quad (7)$$

where $Y_{i,t+1}$ represents the outcome variables (respectively asset expansion, deleveraging, lending policies, profitability, and systemic riskiness for bank *i* in period *t+1*), SEO indicates recapitalizations and takes a value equal to one if bank *i* undertakes a recapitalization in period *t*, and $\boldsymbol{X_{i,t}}$ is the vector of covariates grouped into bank-specific variables, market variables, and macroeconomic variables.

4.2 Propensity score matching

We use the propensity score matching approach to account for whether the SEO is an endogenous decision (not random) and to correct for self-selection. We then investigate how and to what extent the treatment (being recapitalized) changes the average outcome variable (asset expansion vs. deleveraging, lending policies, profitability, and systemic riskiness) for the banks that are actually treated. We need to know what would have happened to the behavior of recapitalized banks had they

[8] When the dependent variable is *SIFI*, we use the conditional logit (or fixed-effect logit model).

not recapitalized. The effect of recapitalization on the outcome of bank *i*, known in the evaluation literature as the average treatment effect on the treated (ATT), can be expressed as:

$$ATT = E\{\Delta y^1_{i,t+\tau} | SEO_{i,t} = 1\} - E\{\Delta y^0_{i,t+\tau} | SEO_{i,t} = 1\} \quad (8)$$

where $SEO_{i,t}$ is a variable that indicates the recapitalization and that takes a value equal to one if bank *i* conducts a recapitalization in period *t*. The $\Delta y^1_{i,t+\tau}$ is the outcome change in bank *i* at time $t+\tau$ after being recapitalized in period *t* (where τ goes from one to three years after the event), and the $\Delta y^0_{i,t+\tau}$ is the hypothetical outcome change in the same bank *i* at the same time $t+\tau$ if it does not recapitalize in period *t* (where, $\Delta y_{i,t+\tau} = y_{i,t+\tau} - y_{i,t+\tau-1}$).[9]

The propensity score matching is a two-stage semi-parametric procedure where in the first stage we estimate the probability of being treated (using a probit regression) on the basis of pre-treatment observables **X**; in the second stage, we match treated and untreated with the same p(X), we calculate the differences in the outcomes, and we average them.

In the first stage, as for the implementation of the matching, the treatment participation is not a random assignment (banks decide whether and when to recapitalize) but depends stochastically on a vector of observable variables. In such a situation, propensity score matching is useful to reduce the dimensionality of the **X** vector. Denoting *p(**X**)* as the propensity score, the conditional probability of receiving the treatment given the pre-treatment variables is:

$$p(\boldsymbol{X}) = Pr[SEO = 1 | \boldsymbol{X} = x] \quad (9)$$

The basic reasoning behind the propensity score is the following: if for any treated observation, we can find a non-treated one that is as similar as possible in terms of observable characteristics, then the difference in the outcome between the treated and the matched control should be due to the treatment itself. That is, once these variables account for (**X**), the assignment to treatment is random.

[9] As there is no direct estimate of the counterfactual mean analogous to the one based on randomization, we use the mean outcome for non-recapitalized banks, that is, $\{\Delta y^0_{i,t+\tau} | SEO_{i,t} = 0\}$.

In the second stage, we identify the untreated sample by the kernel matching procedure. Let W_{ji} denote the weight given to the *j-th* untreated case in making the comparison with the *i-th* treated case (where $0< W_{ji} <1$), then:

$$ATT = \frac{1}{N}\sum_{i\in N}\{\Delta y^{1}_{i,t+\tau} - \sum_{j\in C} W_{ij}\,\Delta y^{0}_{i,t+\tau}\} \quad (10)$$

4.3 Reasons for SEOs

To account for different reasons behind SEOs, we specifically investigate the case where banks use SEOs to strengthen their capital ratios (i.e. capital pressures). For this purpose, we investigate the effects of SEOs by distinguishing low capitalized banks from well-capitalized banks, where low capitalized banks have a common equity capital ratio lower than the regulatory threshold (equal to 3.5% according to Basel III in 2013). This threshold corresponds to 15% of the banks in our sample. These low capitalized banks are the ones that need to raise equity to become compliant with the new regulation, thus they can be considered somewhat as forced recapitalizations.

To further investigate the different reasons behind SEOs, we also analyze the case where banks use SEOs to absorb nonperforming loans. In Europe, and especially for the Italian banking system, the authorities and bankers (Garrido et al., 2016) well recognize the need to stabilize and lessen the nonperforming loans (NPLs) through equity capital. In this regard, we analyze the effects on the same set of outcome variables by distinguishing between banks with a low share of nonperforming loans over gross loans (Low NPLs) and banks with a high share (High NPLs). The thresholds are the 25th and the 75th percentile, respectively.

To analyze how underpricing versus overpricing of bank equity affects SEOs, we identify banks based on the magnitude of their PB ratios. Lakonishok et al. (1994) argue that banks trading on high price multiples are overvalued (glamour stocks) and banks trading on low price multiples are undervalued (value stocks). If low PB ratio stocks are indeed undervalued, managers of these banks should feel reluctant to go through recapitalizations unless there are strong reasons to do so. We

define value stocks as those with a ratio lower than the 20th percentile and glamour stocks as those with a ratio greater than the 80th percentile.

Furthermore, we focus on those banks that go through state interventions (state recapitalizations and state guarantees) and then investigate the effects of the subsequent SEOs. This enables us to find out how results change in presence of prior forced recapitalizations, that typically occur for more fragile banks (Laeven and Valencia, 2012), and to question the view on the stabilizing role of public ownership (Bertay et al., 2015).

Finally, to account for the opportunity to expand assets, we investigate the effects of SEOs by distinguishing banks with low ex-ante asset expansion from banks with high ex-ante asset expansion. The thresholds for each are the 40th and the 60th percentile of total asset growth in the year prior to the recapitalization respectively. Given that hypothesis 1 states that SEOs lead primarily to asset expansion, both high- and low-asset expansion banks should use the proceeds from SEOs to pursue the opportunity to expand their asset portfolio.

5. Empirical results

We perform a preliminary investigation of the differences between recapitalized and non-recapitalized banks during normal and crisis periods for both the dependent variables and control variables (Table 3).

The dependent variables (Table 3, Panel A) both before and after the event show that SEO banks grow more than their non-SEO counterparts (Δ*(TA)*); while there are no significant differences in the growth rate of leverage (Δ*(Lev)*). Before the SEO, recapitalized banks have lower profitability (*ROA* and *Profitability of lending*) and loan reserves than their non-recapitalized peers, whereas they are more involved in lending and contribute more to systemic risk (*SRISK).* After the SEO, recapitalized banks continue to have lower profitability and continue to be more involved in lending and to contribute more to systemic risk. Moreover, the probability of becoming a SIFI bank is higher

for banks that are going to recapitalize, and this difference is statistically significant both before and after the SEO event.

When we focus on recapitalized banks only, Panel B of Table 3 shows that after SEOs, recapitalized banks reduce their lending as compared to the year prior to the recapitalization during the non-crisis period, while no statistically significant differences occur during the crisis. Before SEOs, recapitalized banks put aside lower reserves to offset loan losses during the crisis period as compared to the non-crisis period. After SEOs, recapitalized banks increase loan reserves and decrease profitability, especially during the crisis. Further, banks are less interconnected during the non-crisis period, whereas the opposite occurs during the crisis (i.e., banks have a larger likelihood of becoming a SIFI).

As for control variables (Panel C), recapitalized banks are larger, less capitalized, less cost efficient, less liquid and have lower margins, higher price volatility, longer period listed, and operate in countries with lower growth and lower regulatory quality. During the crisis as opposed to a non-crisis period (Panel D), recapitalized banks are larger, less capitalized, less liquid, more cost efficient, trade on higher price-to-book ratios, have higher price volatility, and operate in countries with lower growth and higher regulatory quality.

5.1 The effects of SEOs – Baseline FE regressions

We report the findings from our baseline FE regressions in Panels A-C of Table 4.[10] First, one year after the recapitalization, banks conduct SEOs mainly for asset expansion rather than for deleveraging. This evidence confirms hypothesis 1. Second, we find that SEOs reduce lending as well as increase credit risk management either through loan reserves or write-offs on loans. This evidence does not confirm hypothesis 2 in that one year after the recapitalizations, SEOs do not lead to increases in lending but their proceeds are used to mitigate credit risk. The effect on credit risk management is crucial to fully understand the effects on the lending policies. Third, SEOs reduce

[10] For all of our specifications, we perform a VIF (variance inflation factor) diagnostic analysis to exclude multicollinearity. The VIF values are lower than 2.5 for all of our coefficients so we don have any multicollinearity.

profitability (*ROA*, and *Profitability of lending*) that is consistent with hypothesis 3. Further, SEOs increase systemic risk (*SRISK*) as well as the likelihood of becoming a SIFI in the year following the recapitalization, which is consistent with hypothesis 4.[11]

As for control variables, in the *Country FE* specification, size positively affects *Asset growth*, *ROA* (as shown in prior studies such as Smirlock, 1985; Goddard et al., 2004; Berrospide and Edge, 2010), systemic risk (in line with prior literature such as Black et al., 2013; Laeven et al., 2014), and the probability of becoming a *SIFI*; whereas it negatively affects lending, loan reserves, and write-offs on loans. Equity positively affects *ROA* and loan reserves, while higher capitalization leads to a reduction in asset expansion, lending, and systemic risk. Liquidity leads to asset expansion and increases write-offs on loans and systemic risk. It decreases loans over total assets and the profitability of lending. The net interest margin increases profitability (*ROA* and *Profitability of lending*). This finding indicates that the banks that are better able to extract margins from traditional banking show better profitability probably due to their bargaining power (as suggested by Holmstrom and Tirole, 1997). Moreover, the net interest margin increases loans over total assets (accordingly to the evidence in Demirguc-Kunt and Huizinga, 1999) and leads to asset expansion, while the higher net interest margin reduces systemic riskiness. Operating inefficiency (*CTI*) increases leverage and loan loss reserves and decreases lending, write-offs on loans, *ROA*, and systemic risk. Price-to-book increases profitability (*ROA* and *Profitability of lending*) and accordingly decreases write-offs. Price volatility increases credit risk management (through loan reserves and write-offs), systemic risk (as documented in Laeven et al., 2014), and the probability of becoming a SIFI; whereas liquidity decreases *ROA*, lending, and leverage. Year listed leads to asset expansion, increases the return on assets, the profitability of lending, and systemic risk; while it decreases loans and loan reserves. Growth at the country level leads to asset expansion and increases in the profitability of lending, loans, and write-

[11] This evidence is validated across the three FE regression specifications for asset growth, deleveraging, lending, loan reserves, and systemic risk. For profitability of lending, the results are validated for all three specifications except when we consider *Year FE,* while for the *SIFI* status the results are validated for all three specifications except when we consider *Country FE.* The effect on write-offs is confirmed only in the *Specialization on lending FE* specification, whereas the effect on *ROA* is confirmed only in the *Year FE* specification.

offs and decreases loan reserves and the probability of becoming a SIFI. Regulatory quality adversely affects profitability, loans, and loan reserves. Crisis negatively affects *ROA* and asset expansion, whereas it positively affects write-offs, leverage, and lending. The findings on control variables remain qualitatively confirmed for the *Year FE* and *Specialization on lending FE* specifications.

5.2 The effects of SEOs - Propensity score matching

Provided that SEOs are discretionary, we investigate their effects on a set of dependent variables by using propensity score matching to detect selection in the observables (Table 5). Specifically, we look at the effects one year after the SEO and also in a longer time interval (two and three years after the SEO). When considering the probit regression results (Table 5, Panel A), the probability of going through an SEO increases with the bank's size, operating efficiency, price volatility and decreases with the bank's equity and year listed. The conditional independence assumption and the common support condition are satisfied.

Asset expansion or deleveraging. Because recapitalizations might be used to generate growth in a bank's assets or to reduce leverage, we use propensity score matching to investigate how a bank's behavior reacts to recapitalizations (Table 5, Panel B). Panel B shows that recapitalized banks experience a larger (and increasing) expansion in assets in the three years following the SEO than their non-issuing peers. At the same time, recapitalized banks do not show any change in their level of leverage in the three years following the SEO compared to their non-issuing peers. In essence, SEOs are associated with asset expansion and not with deleveraging, which indicates that commercial banks pursue a leverage targeting strategy (as shown by Adrian and Shin, 2010 for the US, and by Baglioni et al., 2013 for the EU).

Asset composition. Given that asset expansion can be decomposed into changes in bank loans and changes in other assets, we use propensity score matching to investigate how a bank's lending policies are related to recapitalizations (Table 5, Panel B). Panel B shows that recapitalized banks decrease their lending more than their peers in the year following the SEO. But they increase their lending by more than their non-issuing peers in the subsequent two years. Thus, hypothesis 2 is

validated for years two and three after the recapitalization: once their credit risk is mitigated, banks use the proceeds from SEOs to expand loans.

Furthermore, recapitalized banks increase their loan reserves more than their peers in the first year following their recapitalization and report higher increases in loan write-offs in each of the three years afterwards. The decrease in lending in the short run means that banks do not use the full proceeds from recapitalizations to provide loans (presumably due to the time needed to process loan requests), as documented in prior studies (Francis and Osborne, 2009; Albertazzi and Marchetti, 2010; Martynova, 2015).[12] Alternative uses of the proceeds hence prevail in the short term. One alternative use for the proceeds is an increase in loan reserves, which is confirmed by our empirical evidence: banks need to raise capital to be able to put aside higher loan reserves to be used to offset the write off of bad loans. This finding is consistent with Cummings and Durrani (2016) who find that Australian banks allocate part of their surplus capital above regulatory requirements to pre-fund future credit losses through provisions.

The SEOs increase, rather than decrease as in the first year, lending in the subsequent two years. This increase indicates a positive effect of recapitalizations on lending in the medium term; that is, referring to our analytical model, the lending expansion dominates the changes in asset composition (equation 3), as documented in the prior literature (Myers, 1977; Gambacorta and Mistrulli, 2004; Giannetti and Simonov, 2013). Recapitalizations induce bank managers to increase the credit supply, although not in the short term as it might take time to identify worthy borrowers.

Profitability. When using propensity score matching (Table 5, Panel B), recapitalized banks experience a larger decline in profitability (*ROA* and *Profitability of lending*) in the three years following the SEO than their non-issuing peers. The gap in profitability between issuing and non-issuing banks is stronger when considering changes in profitability over longer time intervals (two to three years following the recapitalization compared with the year prior to the event). Such a decrease

[12] We check reverse causality for the effects of lending on SEOs. The coefficient associated with *Loans* is negative and not statistically significant; thus there is no reverse causality. Note that in our regression specification the dependent variable is measured one year after the recapitalization while all the control variables refer to one year before the event.

in ROA confirms the expectation from our analytical model (equation 4) and is consistent with the economic reasoning provided in prior studies (Myers, 1977; Berger, 1995; Sloan, 1996; Loughran and Ritter, 1997; Teoh, Welch and Wong, 1998).

Furthermore, if we combine the results from profitability and the specialization in lending, then the steeper reduction in *ROA* might be due to at least two components: the increase in write-offs and the reduction in the interest spread on the lending. The reasons might be the reduction in loans granted one year after the SEO and a lower interest spread on lending (in the second and third year after the SEO).

Systemic risk. SEOs increase the systemic risk more than the non-issuing banks in each of the three years following the recapitalization. This finding means that recapitalizations increase the interconnectedness of banks. One possible explanation is the signaling effect of SEOs: during the crisis, recapitalizations of European commercial banks resulted in a loss of confidence in the market (Claessens et al., 2010). Thus, SEOs had a negative signaling effect and increased systemic risk. This effect means that SEOs increased the banks' expected losses when the market was in financial distress (LRMES). The results on SRISK show a hidden effect of recapitalizations.

Another possible explanation is related to the acquisition of the SIFI status via recapitalizations. In the years following the recapitalization, SEOs increase the likelihood of becoming a SIFI and such increase becomes stronger over time. By raising more capital, banks increase their size and hence gain the hidden benefit of reaching a size that guarantees state protection, especially during a crisis (Laeven et al., 2014). Hence a recapitalization introduces moral hazard to the bank, as supported by the increase in write-offs. This negative externality of recapitalizations might presumably not be fully taken into account by regulators when imposing tougher capital requirements.

5.3 Reasons for SEOs

To take into account that different reasons motivate SEOs, and hence they might have different effects, we consider the banks' different attributes and partition our sample on the basis of these

attributes (capital pressures, credit risk severity, underpricing, state interventions, and asset expansion opportunity).

We first investigate the case where banks use SEOs to strengthen their capital ratios. When we distinguish between low capitalized banks and well-capitalized banks, our results show that the effects of recapitalizations are very different for the two subsamples (Table 6, Panel A). For well-capitalized banks, we confirm all the effects for the overall sample. For low capitalized banks, instead, SEOs affect neither profitability (*ROA* and *Profitability of lending*) nor the lending policies (*Loans, Loan Reserves,* and *Write-offs*) in the year following the SEO compared to their non-issuing peers. SEOs of low capitalized banks positively and strongly affect systemic risk. Next, we test the effect of SEOs on the equity level to better understand the effect of capital strength during the transition to Basel III. For low capitalized banks, banks use SEOs to strengthen their capital ratios and actually positively affect equity levels, while for well-capitalized banks, SEOs negatively affect equity levels as they are used for different reasons (as confirmed by the increase in write-offs and loan loss provisions).

To analyze the severity of credit risk as a reason for SEOs, we investigate the effect on different levels of NPLs (Table 6, Panel B). The results show that banks with a low share of NPLs allocate more resources from SEOs to *Loans* in the first year following the SEO than their non-issuing peers. This allocation means that recapitalizations induce bank managers to increase the credit supply in the real economy when they have less trouble with NPLs. Moreover, these banks reduce their exposure to systemic risk (*SRISK*) after the SEOs. The effects are markedly different for banks with a high share of NPLs over gross loans. They use resources from SEOs with the aim to write off bad loans and to absorb losses on loans as shown by the increase in loan reserves and write-offs. For this subsample of banks the exposure to systemic risk (*SRISK*) is higher following SEOs: this exposure means that SEOs increase systemic risk when credit risk at the bank level is especially high. For the profitability from the operating activity (*ROA*), the evidence shows that banks with low nonperforming loans increase their profitability after SEOs, while banks with high nonperforming

loans experience a reduction in these profitability measures because of the reduction in the profitability of their lending.

Moreover to investigate the reasons for SEOs associated to market valuations, we look at the effects of SEOs at different levels of PB ratios as a proxy for underpricing or overpricing of the bank's equity (Table 6, Panel C). The results show that for banks trading on lower PB ratios, SEOs reduce profitability (*ROA* and *Profitability of lending*); while for banks with higher PB ratios, SEOs have no effect on profitability. For banks trading on low as opposed to high PB ratios, SEOs lead to increases as opposed to decreases in loan write-offs. If a bank's PB ratio represents underpricing or overpricing of equity, then equityholders in low PB banks should be very reluctant to see their bank doing a SEO. Our analysis shows that SEOs do not improve performance but instead allow a bank to manage its credit risk via write-offs. The effects of SEOs on systemic risk differ widely between lower and higher PB banks: for underpriced banks SEOs determine an increase in systemic risk, whereas the opposite occurs for overpriced banks. This difference could be explained by the fact that recapitalization might signal that the banking system is riskier than previously expected and therefore other banks might go through a recapitalization too (i.e. fear that other banks may be forced to go through SEOs too).

Furthermore, we focus on those banks that go through state interventions and then investigate the effects of the subsequent SEOs (Table 6, Panel D). We observe that subsequent SEOs increase profitability (*ROA* and *Profitability of lending*) as well as loan loss reserves and write-offs. Moreover, SEOs decrease systemic risk, whereas they have no effect on loans. These findings show that SEOs preceded by state interventions not only increase profitability but also reduce systemic risk, which is different from what is observed for the overall sample and hence support the view on the stabilizing role of public ownership.[13]

[13] Considering these recapitalizations as exogenous events (being they forced), we also use fixed effects for the two subsamples of banks as a robustness test. This test confirms and reinforces the results. SEOs increase the *ROA* for banks that go through a state intervention, whereas there is no effect for other banks. Furthermore, SEOs increase the loan loss reserves more for banks that receive state support than for others. Finally, SEOs decrease the probability of achieving SIFI

Finally, we look at the effects of SEOs for banks with high- and low-asset expansion in the year prior to the recapitalization (Table 6, Panel E). The results show that banks use SEOs as an opportunity to expand their asset portfolios independently of past growth, that is, SEOs lead to asset expansion for both banks with high ex-ante growth and for banks with low ex-ante growth. Still asset expansion after SEOs is stronger for those banks experiencing higher growth over the previous year, and such asset expansion translates into an expansion in loans in the year following SEOs (differently from the baseline evidence). For those banks experiencing lower growth over the previous year, we continue to observe a reduction in loans in the year following SEOs (as in the baseline evidence), and alternative uses of the proceeds (i.e. credit risk management via increase in loan reserves and in write-offs) continue to prevail in the short term (again in line with the baseline evidence).

5.4 Additional analyses and robustness tests

Instrumental variables analysis

In this subsection, we validate our results with an instrumental variable approach.[14]

The variables we use to instrument the recapitalization decision are the proportion of shares held by institutional investors and the value traded in the domestic market. *Institutional investors* is defined as the proportion of shares held by institutional investors. We calculate this variable as the logarithm of the proportion of capital that a bank has that is "not free-floating", if any. The higher the proportion of shares held by institutional investors, the lower the likelihood of recapitalization should be. The rational is threefold. First, the monitoring by institutional investors, who are active outside informed investors that possess private information about firms making SEOs (Chemmanur et al., 2009), facilitates valuable internal control efforts (Shleifer and Vishny, 1986; Denis and Serrano, 1996; Elyasiani and Jia, 2010; Attig et al., 2012). Second, institutional investors aim to avoid a dilution of their shares and therefore discourage recapitalizations. Under the debt overhang condition (Myers,

status much more for state recapitalized banks than for others, which again supports the view on the stabilizing role of state interventions.

[14] When the dependent variable is *SIFI*, we use the probit instrumental variable regression that is estimated with MLE.

1977), the existing shareholders might not benefit from new capital injections because most of the benefits might go to existing creditors. Third, given the well-established evidence on reductions in the share price after SEOs (Asquith and Mullins, 1986; Masulis and Korwar, 1986; Krishnan et al., 2010; Elyasiani et al., 2014; Kim and Purnanandam, 2014; Silva and Bilinski, 2015), investors view equity issues as negative signals (Leland and Pyle, 1977; Myers and Majluf, 1984); this is especially true for institutional investors because of their large shareholdings (Shleifer and Vishny, 1986).

As a second instrument, we use *Value traded* that is defined as the value of the trades of shares on domestic market relative to GDP in country *j*, as justified by Levine and Zervos (1998) and as theoretically motivated by Levine (1991) and Bencivenga et al. (1995). *Value traded* measures trading volumes as a share of national output and should therefore positively reflect liquidity on an economy-wide basis. Given that Levine and Zervos (1998) find that the stock market's liquidity positively predicts capital accumulation, a more liquid market should be associated with a higher number of recapitalizations.

These instruments predict cross-bank variation in the decision to undertake a recapitalization but they are independent from the outcome variables under study.[15] Moreover, the hypothesis that the proportion of institutional investors adversely affects the likelihood of recapitalization and that the value traded positively affects SEOs are confirmed by the results from the first-stage regression (Table 7, Panels A-J, column 1).[16] Thus, our instruments have explanatory power for the endogenous regressor (SEO) after conditioning on all of the other remaining exogenous variables (confirming the relevant condition).

The IV regression analysis confirms the results from propensity score matching (Table 7, columns 2, 3, and 4). In the year following the recapitalization, as shown in the second stage, SEOs

[15] The validity condition (that is the instrument should be uncorrelated with the error term) cannot be tested because *u* is unobservable. Therefore, we run reduced-form regressions; and, for all our regression specifications, the proportion of shares held by institutional investors does not explain the variability in the set of our dependent variables. *Value traded* is not statistically significant for all outcome variables except for profitability and systemic risk variables.

[16] In the first stage, we observe that as expected, institutional investors show a negative coefficient for all the specifications and the magnitude of the coefficient is about -6-7%. And as expected, the value traded shows a positive coefficient and the magnitude is about 20%. The over-identification restriction is satisfied because the Sargan test is not statistically significant.

lead primarily to asset expansion, although a very minor deleveraging is observed. SEOs continue to reduce profitability (*ROA* and *Profitability of lending*) and lending and increase loan reserves, write-offs, systemic risk, and the likelihood of becoming a SIFI. In the second and third year following the recapitalizations, SEOs continue to lead primarily to asset expansion, although a very minor leveraging is observed (taken together first and second year though confirm leverage targeting). SEOs continue to reduce profitability (*ROA* and *Profitability of lending*) and increase lending as well as loan reserves and write-offs. SEOs also continue to increase systemic risk and the likelihood of becoming a SIFI.

Further, the absolute values of the SEO coefficient and the F-test are much higher in the IV regression than in the fixed-effect regressions. These values indicate that SEOs might indeed be mostly discretionary, which validates our use of the IV regression as a robustness test and our choice of instrumental variables.

Systemic risk definition

An alternative measure of systemic risk is $\Delta CoVaR$ that is defined according to Adrian and Brunnermeier (2016) as the difference between the financial system's VaR conditional on a bank being in distress and the financial system's VaR conditional on ongoing base business for the bank.[17] It captures the marginal contribution of a bank to overall systemic risk, but differently from SRISK it does not disentangle the effect of the shock on the balance-sheet component (*LEV*) from the effect of the market-return component. If a bank is under distress and recapitalizations result in a loss of confidence in the market (as argued by Claessens et al., 2010), then recapitalizations increase ΔCoVaR (i.e., SEOs lead to a shift to the left of the bank's return distribution).

[17] $\Delta CoVaR$ is estimated weekly using quantile regressions from January 2002 to December 2014. To allow for a time-varying $\Delta CoVaR$, we also control for a set of global state variables at the European level. Following Adrian and Brunnermeir (2016), we include the change in the three-month government yield at the EU level, the change in the slope of the yield curve, that is, the liquidity spread between the long-term government bond rate and the three-month rate, the EU short-term TED spread (defined as the difference between the three-month interbank Euribor rate and the three-month yield rate on a government bond), the change in the credit spread between the return of the investment grade and government bond yield, the weekly changes in the EU market return (computed from the FTSE EuroTop 100), the weekly real estate sector return in excess of the market financial sector return and the European equity volatility (represented by the EuroStoxx50 volatility *V2X*).

All the results obtained with *SRISK* are confirmed when we consider Δ*CoVaR* as a definition for systemic risk. When considering a systemic risk measure that accounts for only the market-return component (Δ*CoVaR*), the findings confirm that SEOs increase the banks' contribution to systemic risk; this increase means that when banks conduct SEOs, they become not only the biggest losers in a crisis but also become the biggest contributors to the crisis. The results on Δ*CoVaR* confirm a hidden effect of recapitalizations (as reported in Table 5 for PSM and Table 7 for IV).

Crisis definition

As a final robustness test, we replicate our main analysis by using two alternative definitions of the crisis: the global financial crisis of 2007–09 only and both the global financial crisis of 2007–09 and the European sovereign debt crisis of 2010–11. The start of the global financial crisis is identified as August 2007, which is according to the Bank for International Settlements (2010). All the results from the baseline sample are confirmed when we consider as definition of crisis the period 2007-2009 with few exceptions.[18]

6. Conclusions

After the recent financial crisis, regulators as well as governments claim that higher capitalization makes banks sounder and more resilient, and accordingly Basel III has imposed tougher capital requirements. Corporate finance theory argues that a bank has disincentives to raise equity in the stock market but bank regulators believe that, by having higher capital levels, a bank might be able to reduce its insolvency risk and to increase its loss absorbance capacity. The empirical literature on the effects of recapitalizations on banks' behavior is however very limited. This paper hence

[18] The effects on ROA become positive three years after the recapitalization, whilst they become positive on profitability of lending in the second and third year after the recapitalization. When the outcome variable is write-off the coefficient is positive and significant only three years after the recapitalization. The effects of SEO on loans, loan reserves, systemic risk and SIFI are the same with both definitions of crisis. Results from the baseline sample are also confirmed when we include the European sovereign debt crisis (2007-2011) in the crisis definition, although some exceptions remain: the effect on ROA turns out positive two years after the recapitalization, whilst the effect on profitability of lending is not statistically significant three years after the event. The increase in loan reserves and write-offs is confirmed, except in the second year after the event and the effect on loans is confirmed two years following the SEO. The effects of SEO on systemic risk and SIFI are the same with both definitions of crisis. Results are available upon request from the authors.

contributes to the ongoing capital debate by investigating the effects of SEOs on asset expansion versus deleveraging, lending policies, credit risk management decisions, profitability, and the degree of interconnectedness with the banking system for European banks between January 2002 and December 2014.

Concerning the *how* a bank's behavior reacts to a recapitalization, our results show that SEOs lead to assets expansion, and not to any deleveraging. Moreover, SEOs reduce profitability and lending and increase loan reserves and systemic risk in the year following the recapitalization. Decreases in profitability and increases in write-offs and systemic risk persist over the three years following the recapitalization events. Recapitalizations are thus used to manage credit risk, especially during the financial crisis. In addition, the decrease in lending in the first year after a recapitalization is followed by increases in the second and third years. These increases show that recapitalizations are also used to finance the real economy although not in the very short term.

Concerning the *why* a bank's behavior reacts to a recapitalization, we consider five possible cases (i.e.: banks under capital pressure, the severity of its credit risk, underpricing, state interventions, and asset expansion). The results show that when banks have low capital, they essentially use SEOs to strengthen capital ratios. Also, when banks have high nonperforming loans, SEOs are used pervasively to deal with credit risk; while when nonperforming loans are low, SEOs enable bank managers to increase the credit supply with positive effects on the real economy. Underpricing impacts the effects of SEOs on systemic risk; specifically for underpriced banks SEOs lead to an increase in systemic risk, whereas the opposite occurs for overpriced banks. Furthermore, for banks that go through state interventions, the subsequent SEOs not only increase profitability but also reduce systemic risk, which is different from what is observed for the overall sample. Hence, this finding supports the view that public ownership has a stabilizing role. Further, banks use SEOs as an opportunity to expand their asset portfolio independent of their history of past asset growth, which confirms that SEOs are primarily driven by asset expansion.

However, the fact that recapitalizations increase the contribution of banks to systemic risk (both in the short and medium term) means that banks that engage in SEOs become not only the biggest losers in a crisis but also the biggest contributors to the crisis. This evidence is reinforced by our finding that SEOs have a positive effect on the likelihood of becoming a SIFI. By raising more capital, banks increase their size and hence can get the hidden benefit of reaching a size that guarantees state protection during a crisis. This negative externality of recapitalizations presumably might not have been fully taken into account by regulators when imposing tougher capital requirements. The existence of this externality brings into question the steps recently taken by the Basel III Committee towards tougher requirements that pay little attention to the interplay between bank recapitalizations and the too-big-to-fail issue.

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Table 1: Recapitalizations by country and year and control sample

Panel A: number of observations

	Year													
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Control Sample	485	479	483	476	484	481	464	455	469	466	472	473	468	6155
SEO banks	12	18	14	21	13	16	33	42	28	31	25	24	29	306
Total	497	497	497	497	497	497	497	497	497	497	497	497	497	6461

Panel B: Countries

SEO by country and year

	Non-crisis					Crisis				Non-crisis				
Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Austria	0	1	1	0	0	0	0	1	0	0	0	0	1	4
Belgium	0	1	0	0	1	0	1	1	0	0	0	0	0	4
Cyprus	0	0	0	0	1	0	0	0	1	1	2	0	0	5
Denmark	0	1	0	0	0	0	0	5	5	2	6	0	0	19
Finland	0	0	0	0	0	0	0	1	1	2	0	0	0	4
France	0	1	0	1	1	1	3	1	0	1	1	2	2	14
Germany	0	3	1	4	0	0	3	3	2	2	1	2	1	22
Greece	0	3	1	2	1	2	0	4	1	3	0	2	2	21
Hungary	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Ireland	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Italy	3	2	3	4	3	2	7	4	4	7	2	2	7	50
Latvia	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Lithuania	0	0	0	0	0	1	0	1	0	0	0	0	0	2
Malta	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Netherland	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Poland	0	1	0	2	3	0	0	6	3	1	2	5	3	26
Portugal	5	2	2	1	1	2	5	3	2	1	3	1	3	31
Romania	0	0	0	0	0	0	2	0	1	0	0	1	0	4
Slovenia	0	0	0	0	0	0	1	0	0	1	1	0	0	3
Spain	1	1	3	4	1	3	4	5	4	8	5	4	3	46
Sweden	0	0	0	0	0	0	0	1	1	2	0	2	1	7
Uk	3	1	3	2	1	2	7	6	3	0	2	3	5	38
Total	12	18	14	21	13	16	33	42	28	31	25	24	29	306
	78					119				109				

Table 2: Variable definitions

This table presents the areas of interest, names, and definitions of the dependent (Panel A) and control variables (Panel B).

Areas of interest	Variable	Variable name	Variable proxy
		Panel A: Dependent Variables	
Asset expansion	Asset growth	Δ *(TA)*	Ln(Total Assets$_{t+1}$)- Ln(Total Assets$_t$)
Liabilities composition	Deleveraging	Δ *(Lev)*	Lev$_{t+1}$- Lev$_t$ where Lev=Debt/Total Assets
Lending policies	Percentage of total assets invested in loans	*Loans*	Loans/ Total Assets
	Precautionary reserves against credit losses	*Loan Reserves*	Loans Loss Reserves / Total Loans
	Non-collectable credit	*Write-offs*	Write-offs/Total Loans
Profitability	Operating profitability	*ROA*	Operating income/Total Assets
	Profitability of lending	*Prof. Lending*	Net Interest Income on Loans/Avg Earning Assets
Systemic riskiness	Degree of interconnectedness with the other banks (Brownlees and Engle, 2016)	*SRISK*	Bank *i*'s sensitivity to market-return and balance sheet components
	Degree of interconnectedness with the other banks (Adrian and Brunnermeier, 2016)	Δ*CoVaR*	Bank *i*'s contribution to systemic risk
	Dummy variable identifying systemically important financial institutions as defined by the Financial Stability Board	*SIFI*	Time-varying dummy. European banks among Systemically Important Global Banks (G-SIBs).
		Panel B: Control Variables	
Bank-specific variables	Size	*Size*	Ln(Total Assets)
	Capital strength	*Equity*	Total Equity / Total Assets
	Liquidity risk	*Liquidity*	Liquid assets / Total Assets
	Net interest margin	*NIM*	[Interest Income - Interest Expense]/Loans
	Cost-to-income	*CTI*	Operating costs / Intermediation margin
Market variables	Price-to-book ratio	*PB Ratio*	Market value / Book Value of Equity
	Price volatility	*Price Vol.*	Standard deviation of the share price during the year
	Year listed	*Year listed*	Number of years the bank is listed on the exchange.
Macro-variables	GDP growth	*GDP Growth*	Growth in the GDP of the country where the bank is listed
	Regulatory quality	*Reg. Quality*	Ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development [World Bank]

Table 3: Descriptive statistics

The table presents the statistics for the dependent and control variables. Panel A presents the comparison between SEO banks and the control sample. Panel B shows the comparison between the crisis and non-crisis periods for recapitalized banks only. Panel C shows the comparison between SEO banks and the control sample. Panel D shows the comparison between the crisis and non-crisis periods independently of the SEO status.The Mean, Observations, St. Dev., Minimum and Maximum stand for the cross-sectional mean, standard deviation values of the sample of banks one year before the SEO and one year after it. The columns and rows "Diff" report the comparison analysis of bank-specific characteristics (dependent variables and control variables) between SEO and non-SEO banks and between crisis and non-crisis periods respectively. Differences in mean are calculated as the difference between bank-specific variable means with the *p*-values of the tests on the equality of means reported in the last column.

Dependent Variables

Panel A: SEO versus control banks

	SEO=0					SEO=1					Diff.
Variable	Obs.	Mean	St. Dev.	Min.	Max	Obs.	Mean	St. Dev.	Min.	Max	
Δ *(TA) Before*	3468	0.051	0.491	-6.698	3.612	238	0.328	0.580	-3.384	2.168	0.277***
Δ *(TA) After*	3525	0.053	0.495	-6.698	3.612	209	0.305	0.581	-3.484	1.927	0.252***
Δ *(Lev) Before*	3515	0.002	0.235	-2.007	13.259	239	0.004	0.057	-0.502	0.635	0.002
Δ *(Lev) After*	3573	0.002	0.233	-2.007	13.259	209	-0.002	0.021	-0.146	0.183	-0.004
Loans Before	3408	0.541	0.238	0.034	0.849	260	0.585	0.182	0.034	0.849	0.044***
Loans After	3332	0.544	0.238	0.033	0.850	217	0.578	0.177	0.033	0.850	0.034***
Loan Reserves Before	2664	4.724	6.230	0.000	77.626	244	4.122	3.316	0.260	19.353	-0.601**
Loan Reserves After	2620	4.608	6.032	0.000	77.626	205	4.802	5.623	0.219	43.750	0.194
Write-offs Before	3129	0.018	0.394	-11.890	8.177	255	0.013	0.014	-0.004	0.117	-0.005
Write-offs After	3062	0.015	0.415	-12.020	8.162	214	0.016	0.027	-0.012	0.213	0.001***
ROA Before	3999	1.526	3.561	-4.568	12.002	263	0.205	1.579	-4.568	8.065	-1.322***
ROA After	3910	1.606	3.542	-4.017	12.156	218	0.099	1.415	-4.017	4.672	-1.506***
Prof. Lending Before	3652	6.400	1.551	0.000	33.100	252	5.168	4.411	0.000	62.600	-1.234***
Prof. Lending After	3569	6.420	1.569	0.000	34.880	212	4.570	2.362	0.000	21.300	-1.849***
SRISK Before	1441	0.463	1.444	0.000	11.170	202	1.329	2.445	0.000	13.340	0.866***
SRISK After	1504	0.473	1.490	0.000	13.340	183	1.274	2.164	0.000	11.540	0.801***
SIFI Before	6115	0.011	0.109	0.000	1.000	306	0.072	0.259	0.000	1.000	0.061***
SIFI After	5687	0.012	0.109	0.000	1.000	277	0.072	0.259	0.000	1.000	0.062***

Panel B: Crisis versus non-crisis period

	Non-crisis					Crisis					Diff.
Variable	Obs.	Mean	St. Dev.	Min.	Max	Obs.	Mean	St. Dev.	Min.	Max	
Δ *(TA) Before*	123	0.250	0.623	-3.384	1.813	115	0.411	0.521	-0.135	2.168	0.161**
Δ *(TA) After*	99	0.251	0.575	-3.484	1.601	110	0.353	0.585	-0.302	1.927	0.101
Diff.		0.025					-0.075*				
Δ *(Lev) Before*	124	0.005	0.077	-0.502	0.635	115	0.003	0.016	-0.027	0.118	-0.002
Δ *(Lev) After*	99	-0.002	0.029	-0.146	0.183	110	0.002	0.015	-0.027	0.061	0.004
Diff.		-0.019*					-0.001				
Loans Before	144	0.577	0.179	0.034	0.849	116	0.597	0.186	0.034	0.850	0.021
Loans After	106	0.576	0.164	0.055	0.850	111	0.580	0.189	0.033	0.850	0.003
Diff.		-0.018*					-0.009				
Loan Reserves Before	137	5.124	3.630	0.264	19.353	107	2.839	2.314	0.260	15.094	-2.285***
Loan Reserves After	98	5.247	5.700	0.469	42.248	107	4.394	5.548	0.219	43.750	-0.853
Diff.		1.116**					1.805**				
Write-offs Before	140	0.015	0.015	0.000	0.117	115	0.011	0.013	0.004	0.089	-0.004**
Write-offs After	103	0.016	0.031	0.012	0.213	111	0.017	0.023	0.000	0.185	0.001
Diff.		0.005					0.007**				
ROA Before	147	0.011	1.826	-4.567	8.065	116	0.452	1.157	-4.566	4.288	0.441**
ROA After	107	0.198	1.510	-4.017	4.672	111	0.005	1.317	-4.017	2.073	-0.192
Diff.		-0.195					-0.455*				
Prof. Lending Before	137	4.672	5.476	0.000	62.600	115	5.759	2.536	1.350	17.810	1.087**
Prof. Lending After	102	4.585	2.311	0.000	21.000	110	4.557	2.420	1.350	16.700	-0.027
Diff.		0.131					-1.144*				
SRISK Before	119	1.261	2.094	0.000	9.930	83	1.423	2.883	0.000	13.340	0.166
SRISK After	102	1.214	2.239	0.000	11.540	81	1.350	2.076	0.000	7.900	0.137
Diff.		0.017					-0.034				
SIFI Before	187	0.118	0.323	0	1	-	-	-	-	-	-
SIFI After	158	0.095	0.294	0	1	119	0.042	0.201	0	1	-0.053*
Diff.		-0.003*					-				

Control Variables

Panel C: SEO versus control banks

	SEO=0					SEO=1					Diff.
Variable	Obs.	Mean	St. Dev.	Min.	Max	Obs.	Mean	St. Dev.	Min.	Max	
Size	3951	15.140	2.440	10.990	19.890	263	17.580	2.260	10.990	19.890	-2.440***
Equity	4015	0.220	0.270	0.030	0.920	264	0.073	0.080	0.030	0.920	0.150***
Liquidity	3962	0.214	0.182	0.016	0.705	263	0.175	0.123	0.016	0.710	0.038***
NIM	3918	2.337	1.754	-0.666	6.189	261	2.157	1.186	-0.666	6.189	0.181**
CTI	3764	61.236	23.871	9.091	111.010	259	63.567	16.380	27.393	111.016	-2.330**
PB Ratio	2653	1.405	1.509	0.103	19.890	234	1.243	1.529	0.132	19.890	0.161
Price Vol.	1950	24.680	10.919	2.500	82.210	232	29.014	8.938	7.070	59.530	-4.340***
Year listed	3562	12.350	7.668	0.003	35.961	260	16.441	8.509	0.455	35.961	4.090***
GDP Growth	5670	1.314	2.915	-17.950	12.230	294	0.856	2.835	-8.270	12.233	0.457***
Reg. Quality	5646	1.325	0.419	-0.072	1.924	294	1.228	0.386	0.498	1.911	0.096***

Panel D: crisis versus non-crisis period

	Non-crisis					Crisis					Diff.
Variable	Obs.	Mean	St. Dev.	Min.	Max	Obs.	Mean	St. Dev.	Min.	Max	
Size	2578	15.155	2.509	10.996	19.892	1636	15.509	2.462	10.996	19.892	-0.353***
Equity	2616	0.219	0.272	0.026	0.917	1663	0.203	0.264	0.026	0.917	0.015*
Liquidity	2577	0.218	0.186	0.016	0.705	1648	0.201	0.168	0.016	0.705	0.018**
NIM	2550	2.312	1.758	-0.665	6.189	1629	2.346	1.671	-0.666	6.189	-0.034
CTI	2463	62.161	24.162	9.091	111.016	1560	60.162	22.279	9.091	111.016	1.998***
PB Ratio	1674	1.242	1.426	0.103	19.890	1213	1.599	1.599	0.104	19.890	-0.356***
Price Vol.	1500	24.755	11.153	2.890	82.210	682	25.977	9.960	2.500	72.180	-1.220***
Year listed	2646	12.629	7.798	0.003	35.961	1176	12.629	7.798	0.003	36.961	-
GDP Growth	3976	1.549	2.187	-8.863	10.601	1988	0.775	3.937	-17.950	12.230	0.774***
Reg. Quality	3960	1.306	0.420	-0.072	1.912	1980	1.349	0.414	0.381	1.924	-0.043***

Table 4: Fixed-effect regression

In this table, Panels A-C show estimation results for different regression specifications: Panel A shows country fixed-effect estimations, Panel B the specialization on lending fixed-effect estimations, and Panel C shows year fixed-effect estimations. For the SIFI status we report conditional logits with country, specialization on lending, and year fixed effects respectively. Robust standard errors are in the parenthesis after the parameter estimates. The ***, ** and * denote statistical significance at 1%, 5% and 10% respectively. The Number of observations, R-squared, F-test, and the within group variation for the fixed-effect estimations (rho) are reported for all specifications at the end of each panel.

Panel A: Country Fixed Effects									
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
	Δ (TA)	*Δ (Lev)*	*Loans*	*Loan reserves*	*Write-offs*	*ROA*	*Prof. lending*	*SRISK*	*SIFI (logit FE)*
SEO	0.136***	0.0005	-0.021**	1.261***	0.0025	-0.117	-0.277**	0.417***	0.395
	(0.031)	(0.001)	(0.011)	(0.364)	(0.003)	(0.106)	(0.125)	(0.130)	(0.542)
Size	0.059***	-0.002	-0.022***	-0.585***	-0.0015**	0.144***	-0.009	0.385***	5.813***
	(0.007)	(0.004)	(0.003)	(0.103)	(0.0007)	(0.026)	(0.031)	(0.052)	(1.674)
Equity	-0.445**	0.068***	-0.704***	7.024*	-0.023	1.988***	-0.659	-4.985**	40.850
	(0.216)	(0.013)	(0.101)	(3.693)	(0.029)	(0.739)	(0.873)	(2.425)	(25.09)
Liquidity	0.679***	-0.001	-0.821***	0.064	0.0229**	0.474	-1.951***	3.502***	5.166
	(0.089)	(0.005)	(0.030)	(1.180)	(0.009)	(0.305)	(0.359)	(0.467)	(3.546)
NIM	0.047***	-0.007	0.016***	-0.062	-0.0004	0.299***	0.57***	-0.167**	0.298
	(0.013)	(0.007)	(0.004)	(0.164)	(0.0013)	(0.044)	(0.052)	(0.083)	(0.773)
CTI	0.001	0.007*	-0.002**	0.035***	-0.00017**	-0.012***	-0.002	-0.009**	-0.0099
	(0.0007)	(0.004)	(0.0002)	(0.009)	(0.00007)	(0.002)	(0.002)	(0.004)	(0.0298)
PB Ratio	-0.003	-0.006	0.003	-0.208	-0.0035***	0.185***	0.223***	-0.079	-.0609
	(0.012)	(0.007)	(0.004)	(0.148)	(0.001)	(0.042)	(0.049)	(0.076)	(0.778)
Price Vol.	-0.001	-0.002***	-0.001*	.168***	0.0004***	-0.032***	-0.007	0.029***	0.163**
	(0.001)	(0.0008)	(0.0004)	(0.017)	(0.0001)	(0.005)	(0.005)	(0.007)	(0.068)
Year listed	0.002***	-0.001	-0.001***	-0.0001***	-0.00007	0.0006***	0.0008***	0.00008***	.00005
	(0.0004)	(0.002)	(0.0003)	(0.00005)	(0.0004)	(0.0001)	(0.0001)	(0.00002)	(0.0001)
GDP Growth	0.009**	0.002	0.004***	-0.242***	0.027***	0.005	0.081***	0.019	-0.741***
	(0.003)	(0.002)	(0.001)	(0.045)	(0.01)	(0.013)	(0.015)	(0.018)	(0.169)
Reg. Quality	-0.093	-0.007	-0.063*	-3.957***	0.0002	-0.802**	-0.715*	0.018	4.181
	(0.106)	(0.006)	(0.036)	(1.300)	(0.0003)	(0.365)	(0. 431)	(0.464)	(3.074)
Crisis	-0.101***	0.003***	0.037***	-0.626**	0.006***	-0.471***	0.411***	0.002	-4.487***
	(0.020)	(0.001)	(0.007)	(0.245)	(0.002)	(0.069)	(0.082)	(0.097)	(1.016)
Constant	-1.025***	-0.006	1.368***	14.126***	0.0079	-0.698	5.371***	-6.849***	-
	(0.222)	(0.013)	(0.076)	(2.866)	(0.022)	(0.758)	(0.896)	(1.244)	-
N	1116	1116	1114	980	1087	1116	1117	673	603
R-squared	0.194	0.046	0.546	0.304	0.045	0.232	0.436	0.379	266.42***
F-test	24.90***	4.54***	109.91***	26.67***	4.10***	28.18***	35.46***	34.15***	
Rho	0.354	0.047	0.278	0.506	0.604	0.478	0.569	0.366	

Panel B: Specialization on lending Fixed Effects

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
	Δ (TA)	*Δ (Lev)*	*Loans*	*Loan reserves*	*Write-offs*	*ROA*	*Prof. lending*	*Systemic risk*	*SIFI (logit FE)*
SEO	0.173***	0.001	-0.029***	1.158***	0.0389**	-0.149	-0.319**	0.429***	1.55**
	(0.032)	(0.002)	(0.010)	(0.346)	(0.016)	(0.106)	(0.136)	(0.135)	(0.620)
Size	0.049***	-0.002	-0.023***	-0.298***	0.0278***	0.119***	-0.024	0.395***	2.645***
	(0.007)	(0.004)	(0.002)	(0.093)	(0.004)	(0.026)	(0.034)	(0.049)	(0.593)
Equity	0.225	0.095***	-0.728***	0.954	3.095***	4.391***	-1.642	-1.317	-5.51
	(0.259)	(0.014)	(0.095)	(3.617)	(0.136)	(0.865)	(1.114)	(2.246)	(24.693)
Liquidity	0.828***	0.001	-0.761***	-3.207***	-0.092*	1.036***	-0.677*	4.827***	15.570***
	(0.095)	(0.005)	(0.029)	(1.123)	(0.05)	(0.318)	(0.409)	(0.461)	(4.13)
NIM	0.006	-0.001**	0.005	0.491***	-0.023***	0.227***	0.83***	-0.076	0.904
	(0.011)	(0.0006)	(0.003)	(0.130)	(0.0058)	(0.038)	(0.0486)	(0.064)	(0.556)
CTI	0.001	0.009***	-0.002***	.033***	0.0228***	-0.010***	0.0027	0.002	0.024
	(0.0008)	(0.0004)	(0.0002)	(0.009)	(0.007)	(0.003)	(0.0009)	(0.004)	(0.027)
PB Ratio	-0.005	-0.003	0.005	-0.263*	0.0024***	0.222***	0.212***	-0.260***	1.14**
	(0.013)	(0.007)	(0.004)	(0.144)	(0.0006)	(0.043)	(0.055)	(0.076)	(0.735)
Price Vol.	-0.003**	-0.001*	-0.001**	0.148***	0.107***	-0.035***	0.004	0.008	-0.09**
	(0.001)	(0.0006)	(0.0004)	(0.014)	(0.015)	(0.004)	(0.005)	(0.005)	(0.045)
Year listed	0.001**	-0.001	-0.001	-0.00006	-0.001	0.00002	-0.0001***	0.00005	0.0003***
	(0.0005)	(0.0002)	(0.024)	(0.00005)	(0.001)	(0.000016)	(0.00002)	(0.00002)	(0.0001)
GDP Growth	0.0.004	0.006	0.002**	-0.229***	0.003***	0.037***	0.079***	0.039**	-0.214
	(0.003)	(0.002)	(0.001)	(0.041)	(0.0004)	(0.012)	(0.0157)	(0.018)	(0.161)
Reg. Quality	0.085***	-0.004	-0.056***	-1.487***	-0.0001***	-0.075	-0.457***	-0.017	5.219***
	(0.031)	(0.001)	(0.009)	(0.344)	(0.00002)	(0.103)	(0.132)	(0.170)	(1.480)
Crisis	-0.119***	0.002**	0.032***	-0.836***	-0.0005	-0.456***	0.344***	0.021	-2.183*
	(0.021)	(0.001)	(0.006)	(0.240)	(0.011)	(0.069)	(0.089)	(0.103)	(1.187)
Constant	-0.951***	-0.003	1.392***	6.065***	-0.983***	-1.307**	4.087***	-7.485***	-
	(0.188)	(0.010)	(0.059)	(2.287)	(0.096)	(0.628)	(0.809)	(1.120)	-
N	1116	1116	1114	980	1087	1116	1117	673	603
R-squared	0.248	0.048	0.547	0.341	0.289	0.278	0.458	0.417	254.04***
F-test	25.03***	5.90***	100.64***	37.34***	8.55***	35.22***	68.37***	35.56***	
Rho	0.262	0.373	0.532	0.857	0.486	0.493	0.265	0.234	

Panel C: Year Fixed Effects

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
	Δ (TA)	*Δ (Lev)*	*Loans*	*Loan reserves*	*Write-offs*	*ROA*	*Prof. lending*	*Systemic risk*	*SIFI (logit FE)*
SEO	0.194***	0.002	-0.018*	1.392***	0.0228	-0.209**	-0.159	0.475***	1.734**
	(0.032)	(0.002)	(0.010)	(0.356)	(0.017)	(0.101)	(0.126)	(0.139)	(0.595)
Size	0.070***	-0.002	-0.017***	-0.454***	0.023***	0.136***	0.033	0.454***	2.733***
	(0.007)	(0.003)	(0.002)	(0.088)	(0.0038)	(0.023)	(0.028)	(0.047)	(0.518)
Equity	0.135	0.068***	-0.397***	-1.854	2.992***	3.354***	-2.452***	0.141	-9.016
	(0.224)	(0.011)	(0.09)	(3.593)	(0.137)	(0.713)	(0.885)	(2.279)	(17.845)
Liquidity	0.677***	-0.005	-0.872***	-0.108	-0.0769	0.429	-1.348***	4.242***	9.801***
	(0.093)	(0.005)	(0.03)	(1.129)	(0.051)	(0.293)	(0.365)	(0.457)	(2.639)
NIM	0.026**	-0.009	0.008**	0.441***	-0.027***	0.233***	0.924***	-0.057	1.061**
	(0.011)	(0.005)	(0.004)	(0.134)	(0.006)	(0.035)	(0.044)	(0.066)	(0.455)
CTI	0.002***	0.007*	-0.002***	0.031***	0.0027***	-0.013***	0.0007	.0059659	0.0023
	(0.0007)	(0.004)	(0.0002)	(0.009)	(0.0004)	(0.002)	(0.003)	(0.004)	(0.02)
PB Ratio	-0.013	-0.001*	-0.003	-0.153	0.028***	0.192***	0.026	-0.311***	1.032
	(0.013)	(0.0006)	(0.004)	(0.150)	(0.0073)	(0.042)	(0.051)	(0.083)	(0.659)
Price Vol.	-0.001	-0.004	-0.001**	0.169***	0.0029***	-0.036***	0.021***	0.007	-0.074**
	(0.001)	(0.006)	(0.0004)	(0.014)	(0.0006)	(0.004)	(0.0049)	(0.005)	(0.039)
Year listed	0.006	0.004	-0.002	-0.0001***	-0.00001***	0.00003**	-0.0001***	0.00003*	0.003***
	(0.0004)	(0.002)	(0.039)	(0.00005)	(0.000005)	(0.00001)	(0.0002)	(0.00002)	(0.001)
GDP Growth	0.004	0.004	0.0005	-0.415***	0.0866***	0.092***	0.039**	0.071***	-0.003
	(0.005)	(0.002)	(0.002)	(0.059)	(0.0149)	(0. 017)	(0.021)	(0.026)	(0.121)
Reg. Quality	0.156***	-0.008	-0.054***	-1.258***	-0.0037	-0.195**	-0.309***	0.259	6.17***
	(0.028)	(0.001)	(0.009)	(0.332)	(0.0028)	(0.089)	(0.111)	(0.161)	(1.27)
Constant	-1.546***	0.001	1.314***	7.884***	-0.865***	-1.438**	2.98***	-8.981***	-
	(0.175)	(0.009)	(0.059)	(2.213)	(0.0937)	(0.554)	(0.689)	(1.075)	-
N	1116	1116	1114	980	1087	1116	1117	673	603
R-squared	0.236	0.037	0.542	0.333	0.291	0.248	0.423	0.422	307.02***
F-test	34.50***	5.42***	128.11***	40.31***	47.03***	31.66***	95.43***	44.05***	
Rho	0.141	0.067	0.069	0.069	0.018	0.180	0.263	0.015	

Table 5: Propensity score matching (PSM)

The table gives the results from the propensity score matching estimation. Panel A shows the probit regression estimates of banks' propensity to undertake a SEO. The dependent variable equals one for banks that have undertaken a SEO and zero otherwise. All explanatory variables are lagged one year. The standard errors in the estimated coefficients are clustered at the bank level and reported in parenthesis. The *, **, and *** stand for statistical significance at the 10%, 5%, and 1% levels, respectively. In Panel B the average treatment on the treated (ATT) comes from the kernel matching estimator and is computed one, two, and three years after the SEO respectively. ATT is based on bootstrapped standard errors and is in the parentheses.

Panel A: Probit regression	
Variables	*Coeff.*
Size	0.198***
	(0.031)
Equity	-6.530***
	(1.903)
Liquidity	-0.496
	(0.407)
NIM	0.086
	(0.057)
CTI	0.007**
	(0.003)
PB Ratio	-0.017
	(0.062)
Price Vol.	0.009**
	(0.005)
Year listed	-0.00003*
	(0.00001)
GDP Growth	-0.010
	(0.016)
Reg. Quality	-0.016
	(0.125)
Crisis	0.131
	(0.095)
Constant	-4.657***
	(0.784)
N	1450
LR-test	151.60***

Panel B: Average Treatment on the Treated (ATT)			
Outcome variable	*1 year*	*2 years*	*3 years*
Δ (TA)	0.208***	0.216***	0.267***
	(0.062)	(0.040)	(0.059)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
Δ (Lev)	0.000	0.001	-0.000
	(0.002)	(0.002)	(0.003)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
Loans	-0.018**	0.029**	0.019*
	(0.012)	(0.015)	(0.016)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
Loan reserves	0.949*	0.590	0.630
	(0.696)	(0.692)	(0.423)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
Write-offs	0.009***	0.004**	0.003*
	(0.002)	(0.002)	(0.002)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
ROA	-0.130*	-1.385***	-1.366***
	(0.085)	(0.162)	(0.146)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
Prof. Lending	-0.481***	-0.435**	-0.480***
	(0.134)	(0.210)	(0.089)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
SRISK	0.835***	0.765***	0.622***
	(0.273)	(0.180)	(0.255)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096
SIFI	0.085***	0.120***	0.168***
	(0.029)	(0.050)	(0.040)
Treated versus Control	161 versus 1095	161 versus 1095	161 versus 1095
Δ*CoVaR*	0.016***	0.015***	0.024***
	(0.004)	(0.005)	(0.006)
Treated versus Control	186 versus 1096	186 versus 1096	186 versus 1096

Table 6: Reasons for SEOs (PSM)

The table gives the average treatment on the treated (ATT) from the propensity score matching estimation applied to different subsamples: low capitalized banks (with a total common equity ratio lower than 3.5%) versus well-capitalized (Panel A); banks with a low share of nonperforming loans with respect to gross loans is lower than the 25th percentile are defined as Low NPLs versus banks with a share of NPL greater than the 75th percentile that are defined as High NPLs (Panel B); banks with a low price-to-book ratio that is lower than the 20th percentile versus banks with a ratio greater than the 80th percentile that are defined as High PB ratio (Panel C); banks which have received a state recapitalization or state guarantees (Panel D); and banks with low versus high asset growth rates (Panel E). For all subsamples, the probit regression of banks' propensity to undertake a SEO is estimated but not reported. The dependent variable equals one for banks that have undertaken a SEO and zero otherwise. All explanatory variables are lagged one year. The standard errors in the estimated coefficients are clustered at the bank level and are in the parenthesis. The *, **, and *** stand for statistical significance at the 10%, 5%, and 1% levels, respectively. The average treatment on the treated (ATT) comes from the kernel matching estimator and is computed one year after the SEO. The ATT is based on bootstrapped standard errors and they are in the parentheses. When the effects are estimated on Equity (outcome variable) we remove it from the vector of regressors.

	Panel A		*Panel B*		*Panel C*		*Panel D*	*Panel E*	
Outcome variables	*Low Capitalized*	*Well-Capitalized*	*Low NPLs*	*High NPLs*	*Low PB ratio*	*High PB ratio*	*State recapitalization*	*Low asset growth*	*High asset growth*
Δ (TA)	0.355***	0.033*	-0.036	0.182*	0.328***	0.018	0.546***	0.020**	0.132***
	(0.066)	(0.027)	(0.133)	(0.143)	(0.108)	(0.063)	(0.195)	(0.015)	(0.081)
Δ (Lev)	0.000	0.000	-0.004	0.003	0.002	0.001	0.011	0.001	-0.000
	(0.001)	(0.002)	(0.004)	(0.004)	(0.003)	(0.006)	(0.072)	(0.003)	(0.001)
Loans	-0.024	-0.016**	0.018***	-0.015	0.023*	-0.029	0.053	-0.028**	0.025***
	(0.021)	(0.011)	(0.006)	(0.027)	(0.011)	(0.112)	(0.048)	(0.024)	(0.015)
Loan reserves	0.380	1.622**	0.037	3.015**	0.881*	2.985**	0.907*	2.907**	0.412**
	(0.459)	(0.707)	(0.373)	(1.673)	(0.371)	(0.847)	(0.695)	(1.710)	(0.254)
Write-offs	-0.001	0.008***	-0.001	0.029**	0.006*	-0.006**	0.011*	0.012***	0.001
	(0.003)	(0.003)	(0.007)	(0.010)	(0.005)	(0.002)	(0.007)	(0.006)	(0.002)
ROA	0.071	-0.294***	0.452**	-0.687*	-0.372**	-0.125	0.117**	-0.391**	-0.019
	(0.131)	(0.111)	(0.245)	(0.552)	(0.205)	(0.274)	(0.044)	(0.309)	(0.118)
Prof. Lending	-0.202	-0.678***	-0.221	-0.654***	-0.561***	-0.150	0.787***	-0.469***	-0.325**
	(0.259)	(0.194)	(0.538)	(0.185)	(0.242)	(0.933)	(0.322)	(0.212)	(0.205)
SRISK	1.071**	0.098*	-0.683**	0.733*	1.605***	-0.546**	-0.630*	-0.007	0.612**
	(0.386)	(0.085)	(0.417)	(0.493)	(0.313)	(0.166)	(0.542)	(0.057)	(0.376)
SIFI	-0.031	0.118***	0.061	0.101*	0.039	0.001	-0.062*	0.015	-0.029
	(0.038)	(0.038)	(0.051)	(0.061)	(0.068)	(0.023)	(0.041)	(0.023)	(0.039)
Equity	0.006***	-0.014***							
	(0.002)	(0.002)							
Treated versus control	88 versus 252	98 versus 876	28 versus 149	31 versus 154	43 versus 176	20 versus 164	20 versus 14	46 versus 312	85 versus 396
N	347	1103	211	224	373	190	40	446	508
LR-test	24.76***	102.28***	36.62**	21.44**	49.64***	26.28**	24.32***	30.10***	104.16***

Table 7: Instrumental variable results

In this table, Panels A-J show the estimation results for the IV regression analysis: column (1) gives the first-stage regression results, whereas columns (2), (3), and (4) give the second-stage results one, two, and three years after the SEOs. Each panel shows the effects of SEOs on each dependent variable: Asset Growth (*Panel A*), Deleveraging (*Panel B*), Loans *(Panel C)*, Loan loss reserves *(Panel D),* Write-offs *(Panel E),* ROA *(Panel F),* Profitability of lending *(Panel G),* SRISK *(Panel H),* ΔCoVaR *(Panel J). Panel I* (SIFI *status*) shows the probit instrumental variable regression estimated via MLE. The robust standard errors are in the parenthesis after the parameter estimates. The *, **, and *** stand for statistical significance at the 10%, 5%, and 1% levels, respectively . The Number of observations, R-squared, Wald test, and Sargan test are given for all specifications at the end of each panel.

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
		Panel A: Asset Growth				*Panel B: Deleveraging*		
Variables	First stage	After 1 year	After 2 years	After 3 years	First stage	After 1 year	After 2 years	After 3 years
SEO		0.487**	0.464**	0.777***		-0.019**	0.021**	-0.007
		(0.215)	(0.235)	(0.232)		(0.010)	(0.010)	(0.010)
Inst. Investor	-0.044**				-0.057**			
	(0.018)				(0.015)			
Value Traded	0.243***				0.236*			
	(0.064)				(0.059)			
Constant	-1.2***	-1.286***	-1.753***	-1.544***	-0.977	0.008	0.014	-0.022
	(0.418)	(0.073)	(0.127)	(0.037)	(0.35)	(0.013)	(0.014)	(0.014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	684	684	571	471	684	684	571	471
R-squared	0.048	0.191	0.199	0.047	0.1314	0.1771	0.1720	0.0713
F-test (Wald)	122.13***	194.21***	161.95***	122.13***	7.801***	39.62***	32.68***	48.26***
Sargan test	0.766	-	-	-	0.426	-	-	-
		Panel C: Loans				*Panel D: Loan reserves*		
Variables	First stage	After 1 year	After 2 years	After 3 years	First stage	After 1 year	After 2 years	After 3 years
SEO		-0.065***	0.264***	0.214***		4.867***	4.756***	8.423***
		(0.02)	(0.013)	(0.016)		(0.538)	(0.894)	(2.201)
Inst. Investor	-0.062**				-0.064**			
	(0.024)				(0.025)			
Value Traded	0.213*				0.231***			
	(0.075)				(0.075)			
Constant	-0.778	1.332***	1.947***	1.022**	-0.786	8.497***	11.855***	12.701***
	(0.498)	(0.023)	(0.044)	(0.321)	(0.531)	(1.234)	(2.534)	(3.58)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	705	705	586	479	637	637	525	432
R-squared	0.135	0.577	0.049	0.123	0.134	0.284	0.228	0.068
F-test (Wald)	8.34***	982.67***	746.27***	685.46***	7.43***	312.10***	179.19***	96.70***
Sargan test	0.669	-	-	-	0.653	-	-	-
		Panel E: Write-offs				*Panel F: ROA*		
Variables	First stage	After 1 year	After 2 years	After 3 years	First stage	After 1 year	After 2 years	After 3 years
SEO		0.031***	0.001	0.028***		-0.736***	-0.549***	-0.595***
		(0.006)	(0.005)	(0.008)		(0.014)	(0.06)	(0.206)
Inst. Investor	-0.061**				-0.063**			
	(0.025)				(0.024)			
Value Traded	0.224***				0.214***			
	(0.078)				(0.075)			
Constant	-0.726	0.054***	0.043*	0.009	-0.845*	-2.500***	-1.900***	-1.002***
	(0.514)	(0.02)	(0.022)	(0.011)	(0.482)	(0.052)	(0.029)	(0.033)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	687	687	567	464	707	707	587	479
R-squared	0.141	0.166	0.076	0.192	0.135	0.285	0.174	0.156
F-test (Wald)	8.55***	80.58***	50.26***	43.72***	8.34***	309.26***	159.49***	109.10***
Sargan test	0.001	-	-	-	0.602	-	-	-
		Panel G: Profitability of lending				*Panel H: SRISK*		
Variables	First stage	After 1 year	After 2 years	After 3 years	First stage	After 1 year	After 2 years	After 3 years
SEO		-3.558***	-0.956***	-1.235***		0.844**	0.711	0.895***
		(0.173)	(0.084)	(0.448)		(0.347)	(0.484)	(0.361)
Inst. Investor	-0.062**				-0.071**			
	(0.024)				(0.035)			
Value Traded	0.215***				0.242**			
	(0.075)				(0.105)			
Constant	-0.836*	2.221***	1.109***	0.543***	-1.624	-9.215***	-9.322***	-9.538***
	(0.479)	(0.356)	(0.222)	(0.111)	(0.983)	(0.647)	(0.625)	(0.731)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	708	708	587	479	446	446	384	327
R-squared	0.135	0.246	0.485	0.540	0.142	0.464	0.489	0.499
F-test (Wald)	8.35***	480.67***	529.34***	600.02***	5.46***	369.26***	355.11***	317.14***
Sargan test	0.045	-	-	-	0.579	-	-	-
		Panel I: SIFI				*Panel J: ΔCoVaR*		
Variables	First stage	After 1 year	After 2 years	After 3 years	First stage	After 1 year	After 2 years	After 3 years
SEO		0.164***	0.217***	0.410**		0.013	0.045**	0.095***
		(0.029)	(0.126)	(0.185)		(0.024)	(0.024)	(0.028)
Inst. Investor	-0.060***				-0.056***			
	(0.022)				(0.015)			
Value Traded	0.208***				0.195***			
	(0.064)				(0.058)			
Constant	-0.925**	-0.751***	-0.871***	-0.968***	-0.951***	-0.224***	-0.241***	-0.257***
	(0.455)	(0.062)	(0.153)	(0.013)	(0.326)	(0.027)	(0.029)	(0.037)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	850	850	742	637	760	760	670	577
R-squared	0.131	0.208	0.119	0.111	0.1341	0.3546	0.2963	0.0994
F-test (Wald)	9.74***	259.10***	197.76***	200.19***	8.24***	417.83***	339.62***	241.18***
Sargan test	0.679	-	-	-	0.324	-	-	-