

# Targeting return on equity: Banks' ownership structure and risk taking

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## Abstract

Based on a unique hand-collected data on the strategy of targeting return on equity (ROE) by 224 public commercial banks in Europe from 1995 to 2016, we conduct the first study on banks' actual practice of targeting ROE. Our results show that banks with concentrated controlling ownership are more likely to target ROE. Among the banks with ROE target, the banks with higher insider holdings are less likely to publish the exact number of the target. This reviews that ROE targeting is more in line with agency theory rather than the theory of signalling, similar to the dividend payout policy. How would the management acts to achieve the goal and what is the actions' implication on banks' risk taking in the following year? Our evidence shows that banks, which become more likely to target ROE, are riskier, in terms of return-on-assets volatility and Value-at-Risk in the coming year. Yet, for banks paying dividends, leveraging up their balance sheets becomes a short cut to achieve a high return on equity. However, dividend-paying banks become less likely to default within a year. As targeting ROE is a managerial strategy for the interests of stockholders, our study contributes to our understanding of not only the targeting itself, but also the link between bank ownership structure and risk taking.

*Keywords:* Banks; targeting return on equity; agency theory; risk taking; leverage

*JEL classifications:* G21; G32; G34; G35

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## 1. Introduction

As suppliers of capital, shareholders are regarded as owners of a corporation. Yet, the separation of finance and management, or ownership and control, in public corporations is the obstacle for shareholders to control the payoffs on their investment. This agency problem is based on the contractual view of a firm (See Coase, 1937; Jensen and Meckling, 1976; Fama and Jensen, 1983a,b). Since the manager and the financier cannot write the circumstances not fully foreseen in their contract, managers do have most of the residual control rights (Shleifer and Vishny, 1997). Great costs for investors are incurred when managers pursue projects of their private benefits (See Jensen, 1986; Grossman and Hart, 1988). This creates problems for financiers to assure themselves of getting a return on their investment.

One natural choice of returning profits to shareholders is to pay out dividends. There are three traditional motives of payout policy: aforementioned agency theory, signaling the firm's quality to investors by the informational-advantaged manager, and taxation benefits from dividends. While, the evidence in the literature on payout policy is in favour of agency considerations (See Lintner, 1956; DeAngelo et al., 2004, 2006; Leary and Michaely, 2011; Michaely and Roberts, 2012; Farre-Mensa et al., 2014).

In the banking industry, besides paying out dividends, there is another channel aiming at delivering returns to the financiers. Frequently, the manager sets targets for return on equity (ROE, the ratio of net income to total equity). This targeting ROE seems like a signal that the manager promises to serve the interests of the shareholders. ROE is one of the most commonly used metrics for bank profitability and performance. Many banks set ROE targets, which are published and reviewed in their financial reports. However, banks are criticized for targeting ROE, since banks

could be encouraged to lever up their balance sheets to race with their competitors<sup>1</sup>. Haldane (2009) points out that the dominate drive of banks' ROE is leverage rather than return on assets (ROA, which reflects the management skill in extracting profits from the assets pool), especially during the golden era of banks' equity market from 1986 to 2006, simultaneously with high pressure of competition. Motivated by Haldane's (2009) talk, Pagratis et al. (2014) estimate a dynamic partial adjustment equation and show that banks make active use of leverage to affect the speed of adjustment towards their latent unobserved ROE targets.

At the same time, the ramification of the recent financial crisis, lightened by the forehead sub-prime mortgage crisis, to the broad economy has placed a sharp spotlight on banks' risk taking and their potential systemic risk. In response to this type of criticism, regulatory frameworks, such as the Basel Accords<sup>2</sup> have been put in place to require banks to hold more capital in relation to their assets' risk profile, and to put an upper limit on banks' risk taking, especially with Basel III's (2010) cap on banks' leverage and the requirements for additional conservation and countercyclical capital buffers.

For firms with limited liability, there is incentive for stockholders to increase the risk of the firm since this can increase the value of their equity *call* options by increasing the risk of the underlying assets (See Galai and Masulis, 1976; Esty, 1998). While the safe net system for banks, typically deposit insurance, results in a positive premia similar as a *put* option for shareholders, which also increases with the bank risk (See Merton, 1977; Keeley, 1990). Motivated by these theories, Saunders et al. (1990) find evidence that higher proportion of stock owned by managers increases

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<sup>1</sup>A simple math shows that ROE is equal to return on assets (ROA, the ratio of net income to total assets) times leverage (the ratio of total assets to total equity).

<sup>2</sup>The Basel Accords are the banking supervision accords promulgated by the Basel Committee on Banking Supervision.

bank risk, which is consistent with the hypothesis that stockholder controlled banks have incentives to take higher risk than managerially controlled banks. Laeven and Levine (2009) document that bank risk is generally higher in banks that have large owners with substantial cash flow rights. In line with this link between the comparative power of stockholders over the manager within the corporate governance structure of a bank and bank risk, targeting ROE could be a very informative channel to detect this link. Since targeting ROE is the manager's decision regarding the extent of serving the interests of shareholders, it reflects the power over residual control rights by stockholders versus the manager, and the potential change of management aiming at achieving the goal could contribute to banks' risk taking, as Haldane (2009) observes.

In short, we study which banks target ROE, their different strategies of reviewing targets, and the implication of targeting ROE on banks' risk taking. Meanwhile, we explore possible impact of the corporate governance structure, particularly the ownership structure. Different from the previous literature on ROE target, we investigate the actual practice of setting ROE targets. For all public commercial banks in Europe, we hand collect data on whether a bank sets any target for ROE and the level of the target if available, from their annual filling reports. Then the data is compiled with the banks' fundamentals and various measures of risk based on the data from Standard & Pool's Capital IQ database. This results in a sample of 224 banks from 32 countries during the period from 1995 to 2016. First, we study whether banks choose to set any target and whether to publish the explicit and exact level of the target<sup>3</sup>. Second, the probability of targeting ROE from the first stage is used to study its impact on banks' risk taking in the following year. To the best of our knowledge,

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<sup>3</sup>Since we can only observe a bank's action when a target is published, the probability of setting a target in this study is actually the compound probability of setting and publishing a target. Nevertheless, for brevity, we call it the probability of setting a target. Yet, within the pool of banks with ROE target, when a bank publishes a specific number of the target, it partially reflects the probability of publishing since the number of the target should be internally known.

our project is the first studying banks' actual practice of setting and publishing ROE targets in a systematic way.

Our results indicate the importance of ownership structure in determining banks' strategies of targeting ROE. More specifically, banks with larger shareholders having concentrated control (voting rights), rather than just being large in terms of cash-flow rights, are more likely to target ROE. This is consistent with the literature on having large shareholders by exercising their voting rights to control the management, and therefore reducing the agency conflict between shareholders and the manager (See Shleifer and Vishny, 1986, 1997; La Porta et al., 2002). At the same time, since expropriating resources from the corporation by the controlling shareholders (See Jensen and Meckling, 1976) is costly, increases in the cash-flow rights of the controlling owner will reduce this type of expropriation, holding other factors constant (Burkart et al., 1997). However, among the banks with ROE target, the banks with higher holdings by the insiders are less likely to publish the exact number of the target. This reviews that the underlying explanation is not the theory of signaling that the manager tends to convey banks' quality to investors, but the agency problem associated with the manager's private interests, similar to dividend payout policy.

What would the manager do in the following year to achieve the set goal for ROE? Our evidence shows that banks, which become more likely to target ROE, are riskier, in terms of ROA volatility and Value-at-Risk of their stocks in the coming year. However, for the banks paying out dividends, higher leverage becomes a short cut to achieve a high ROE. The latter is in line with Haldane's (2009) observation and Pagratis et al.'s (2014) estimation that banks lever up their balance sheets to race with competitors. The constraint policy of paying out dividends might contribute to the leverage up due to limited investment, since a large literature documents that payout policy is sticky (See Lintner, 1956; Leary and Michaely, 2011; Farre-Mensa et al., 2014) and managers state that

they would forego some positive net-present-value projects before cutting dividends (See Brav et al., 2005). However, for banks paying out dividends, the impact of targeting ROE is that their stocks' tail risk (Value-at-Risk) is not higher and, yet, default risk (calculated using equity data, based on Merton's (1974) model that the equity of a firm is viewed as a call option on the firm's assets) becomes lower.

Our study contributes not only to the understanding of banks' strategy of targeting ROE, but also to the literature on banks' ownership structure and its implication on banks' management and risk taking. It is also highly relevant for policy making in terms of bank regulation.

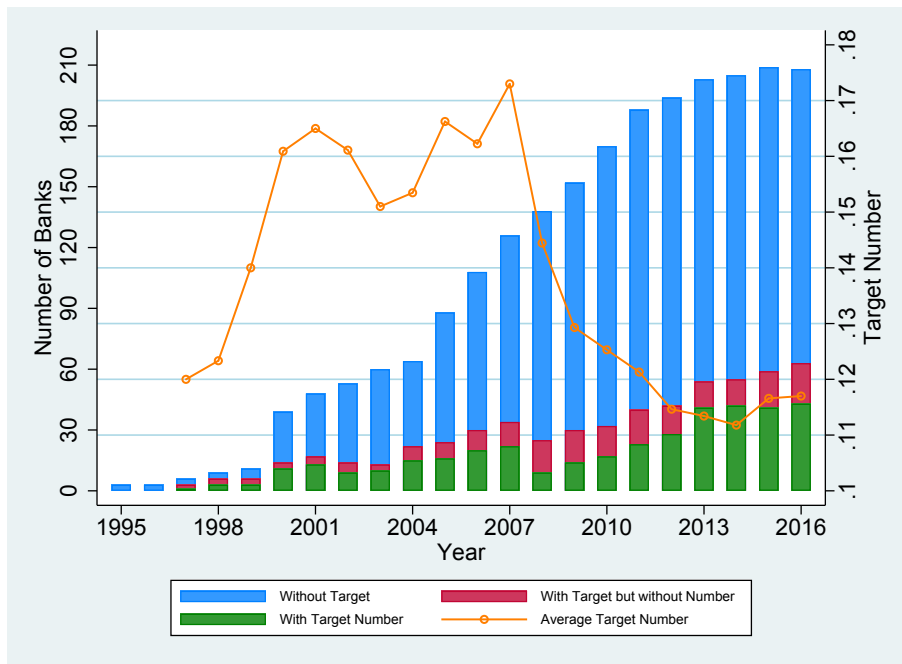
The remainder of the paper is organized as follows. Section 2 describes the data used in our analysis, including how the data on targeting ROE is collected. In Section 3, we discuss the methodology for the empirical tests. In Section 4, we conduct our empirical tests and analyze the implication of our results. Section 5 concludes.

## **2. Data**

We hand collect a unique dataset on the strategy of setting ROE targets from the filing reports of all public commercial banks in Europe from 1990 to 2016. Then this targeting-ROE dataset is matched with the banks' fundamentals and various measures of risk based on the data from Standard & Poor's Capital IQ database. We also convert the valuations from the local reporting currencies into US dollars. This results in a sample of 224 banks in 32 countries from 1995 to 2016. We collect the data on whether a bank has a ROE target or not at the end of each year and the level of the target if available. Since we can only observe the target if it is published in the reports, the indicator of targeting ROE is a compound indication of setting target and publishing the target. Nevertheless,

for brevity, we refer it to the indication of setting target from now on. Some banks disclose the exact number of the target, while others unfold their targets differently, such as “competitive with top peers”. We only collect the target number if it is disclosed explicitly. Banks disclose explicit target numbers for the coming year or/and in a medium or/and long term. To ensure the highest consistency as possible, we only collect the target number for the nearest future and the lower end if it is in a range. Yet, some banks use before tax figures while others use after tax figures, and some banks only have targets for their core business. Since there are various differences in reporting the target numbers, we limit the discussion of the target levels only to describing them in this section, as the levels of the target do convey certain information and contribute to our understanding of how the targets are set.

**Figure 1:** Number of banks with different strategies of targeting ROE and the target level

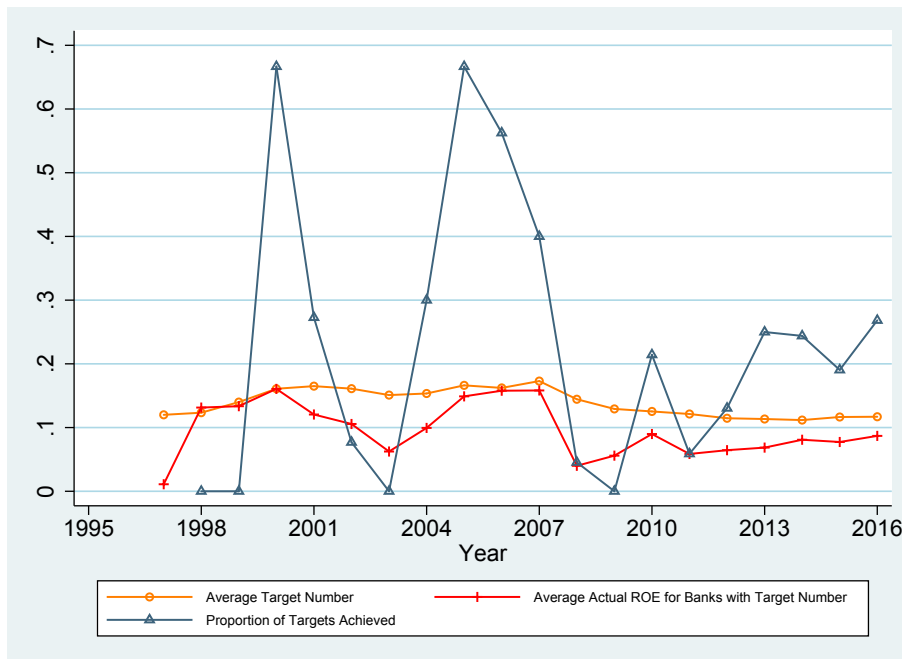


This figure shows, at the end of each year, the number of banks without target, of those with target but without exact target level, and of those with exact target level. It also displays the average target level for banks explicitly disclosing the levels.

In total, we have 2285 bank-year observations on whether a bank targets ROE or not, and 25.5%

of these indicate ROE targeting. Among the targeting-ROE observations, 65.4% have explicit target levels available. Almost half of the banks in 32 countries have set some target for ROE. Figure 1 shows the numbers of banks with different strategies of targeting and disclosing and the explicit target levels if available. Our sample of banks becomes larger overtime, mainly due to the availability of the filling reports, associated with the requirement of more-transparent reporting and publishing. One obvious trend is that the number of banks with target (the sum of the green and cranberry bars) and that of banks with available target number (the green bar) are pro-cyclical. This trend is more distinct for the average target level. Banks are more pro to set ROE targets and set targets higher when the market condition becomes better. This pictures that banks set targets due to the confidence of better performance in terms of ROE and the publication of the targets conveys certain information to the investors.

**Figure 2:** Target level, actual ROE, and the achievement of targets



This figure shows, at the end of each year, the average published target level, the same as in Figure 1, the average actual ROE for the banks publishing target levels, and the average proportion of the targets achieved in the following year.



Then we look closely into the explicit target levels in Figure 2, which shows the average published target level, the same as in Figure 1, the average actual ROE for those banks, and the average proportion of targets achieved in the following year. The ROE target is less pro-cyclical than the actual ROE. Banks do set more stable and ambitious targets, even more ambitious during the economic downturn. This helps to explain why banks prefer to set targets for the medium or/and long term. Then we compare the target with the actual ROE in the following year for each bank to see how often the targets are achieved. The resulting average achievement rate is much more pro-cyclical, which is expected also due to that not all the targets are for one-year horizon. For this comparison of one-year horizon, on average, 23.7% of the targets are achieved.

**Table 1:** Summary statistics (224 banks in 32 countries) for banks with/without target

VARIABLES	Banks with target (100 banks in 26 countries)					Banks without target (200 banks in 31 countries)				
	Observations	Mean	Std. dev.	Min.	Max.	Observations	Mean	Std. dev.	Min.	Max.
Dummy for targeting ROE	583	1	0	1	1	1,702	0	0	0	0
ROE target	381	0.13	0.041	0.045	0.28					
Return on equity (ROE)	580	0.095	0.092	-1.16	0.37	1,676	0.036	0.46	-12.4	0.81
Return on assets (ROA)	581	-0.018	0.61	-14.6	0.040	1,678	0.0058	0.015	-0.12	0.21
Equity-to-assets ratio	580	0.069	0.034	0.0099	0.45	1,664	0.093	0.059	0.0015	0.72
Risk-adjusted capital ratio	434	0.15	0.041	0.088	0.32	984	0.15	0.061	0.0090	0.82
ROA volatility	542	0.0029	0.0068	6.0e-06	0.11	1,442	0.0058	0.013	2.0e-06	0.17
Asset risk	386	0.47	0.18	0.16	0.94	732	0.58	0.19	0.086	1.19
95% Value-at-Risk	527	0.031	0.024	0	0.35	1,421	0.033	0.026	0	0.34
Stock volatility	527	0.35	0.47	0.069	8.75	1,421	0.36	0.28	0.017	3.74
Default risk	380	0.34	0.40	0	1	958	0.23	0.35	0	1
Total assets (mn USD)	563	301,287	585,854	174	3.46e+06	1,675	120,717	344,924	3.09	3.67e+06
$\widehat{p1}_{target}$	252	0.64	0.37	5.5e-06	1	533	0.16	0.24	1.0e-08	1
$\widehat{p2}_{target}$	248	0.66	0.36	1.6e-06	1	523	0.16	0.21	0	1

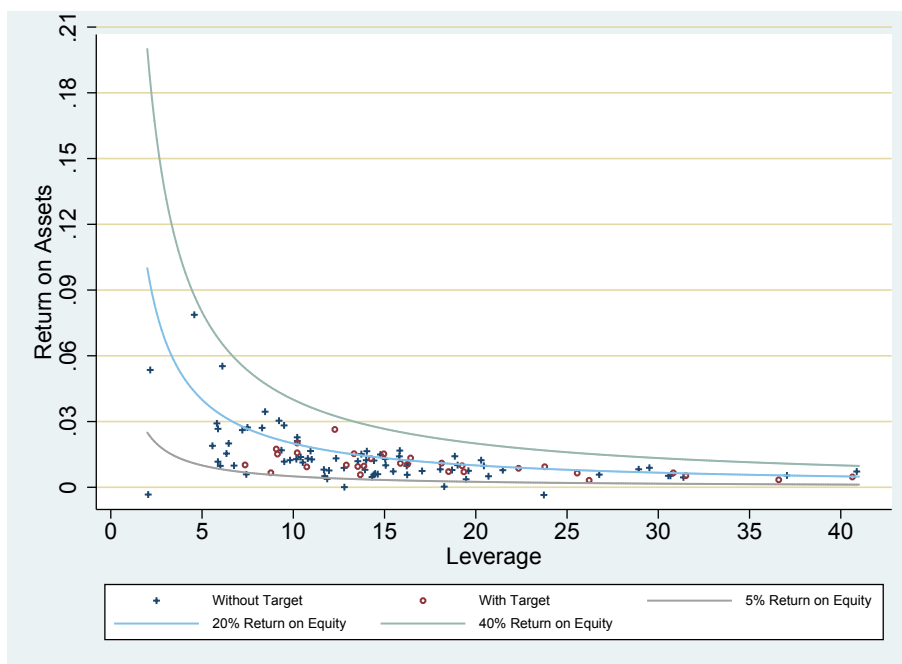
This table displays the statistics of our main variables in the analysis for two groups: banks with target and those without target. *ROE target* is the level of the published target number. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *ROA volatility* is the volatility of quarterly ROAs during a year. *Asset risk* is valued as the ratio of total risk-adjusted assets to total assets. *95% Value-at-Risk* is the absolute value of the maximum daily return expected to be lost over a year, at 95% confidence level, calculated based on the historical method. *Stock volatility* is the yearly-based volatility of daily stock returns during a year. *Default risk* is calculated based on Merton's (1974) model that the equity of a firm is viewed as a call option on the firm's assets, in line with Black and Scholes's (1973) model, and by applying Vassalou and Xing's (2004) computing procedure.  $\widehat{p1}_{target}$  is our model-implied bank-level probability of targeting ROE, which is used in our main analysis, while an alternative prediction  $\widehat{p2}_{target}$  is used in the robustness checks. *Total assets* is in millions of US dollars.

Table 1 summarizes the main variables in our analysis for the two groups: banks with target and those without target<sup>4</sup>. An initial observation is that, compared to banks without target, on average,

<sup>4</sup>Notice that since banks do change the policy of targeting ROE, one bank is very likely in different groups in

banks with target do not earn higher return on assets, but have higher return on equity and higher leverage (lower *Equity-to-assets ratio*). This could indicate that banks use leverage to compete with their peers. Yet, on average, banks with target have the same risk-adjusted capital ratio as other banks.

**Figure 3:** Return on assets and leverage, end-2006



This figure scatters observations of return on assets and leverage (the inverse of *Equity-to-assets ratio*) at the end of 2006, and also plots three iso-ROE curves, drawn at 5%, 20%, and 40% shown from the down-left to the up-right of the figure. The blue crosses are for banks without target and the red circles are for banks with target.

Similar to Haldane (2009), we also plot the decomposition of ROE, i.e. ROA and leverage, at the end of 2006, to investigate which is the dominant driver of ROE (See Figure 3). Same as Haldane’s (2009) observation, the scattered points for ROA and leverage lie along the downward-sloping part of the iso-ROE curves, which indicates leverage is the main driver of ROE. The phenomenon is more profound for banks with target (the red circles in the figure).

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different years. For variables that do not vary so much within a bank, such as *Total assets*, the statistics for the sub groups might be misleading. Yet, they do convey some information on targeting ROE and supplement our analysis in Section 4.

To study the impact of targeting ROE on banks' risk taking, in addition to leverage (the inverse of *Equity-to-assets ratio*), we use other five different measures of risk: *ROA volatility* (the volatility of quarterly ROAs during a year) and *Asset risk* (the ratio of total risk-adjusted assets to total assets) for assets, *Stock volatility* (yearly volatility of daily stock returns) and *95% Value-at-Risk* (the maximum expected loss over a year, at 95% confidence level) for stocks, and the overall *Default risk* of a bank. *Default risk* is calculated based on Merton's (1974) model that the equity of a firm is viewed as a call option on the firm's assets, in line with Black and Scholes's (1973) model. As for the methodology, we apply Vassalou and Xing's (2004) computing procedure with iterative estimation to estimate the market value and volatility of a bank's assets using the market value of its equity<sup>5</sup>.

Back to the statistics in Table 1, compared to the banks without ROE target, on average, banks with target are slightly less risky in terms of *ROA Volatility*, *Asset risk*, *95% Value-at-Risk*, and *Stock volatility*. However, on average, banks with target have higher *Default risk*. In addition, banks with target, on average, are much larger in size. Our estimated probability of setting target ( $\widehat{p1}_{target}$ , used in the main analysis) for banks with target, on average, is as three times as that for banks without target. This difference is the same for the alternative estimate ( $\widehat{p2}_{target}$ , used in the robustness checks).

Table 2 summarizes all the variables for the whole sample.

Besides *Size* (the natural logarithm of *Total assets*) and the aforementioned various measures

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<sup>5</sup>Here we neglect the *put* option value of various implicit and explicit government guarantee and safety net for banks, such as bailout and deposit insurance, due to the data limitation and estimation difficulty. To minimize the impact of different regulations and safety net in each country, we have country fixed effects in our bank random-effect panel models and year fixed effects in our bank fixed-effect panel models. Although there are still concerns about the application of Merton's (1974) model for banks, Jessen and Lando (2015) show that the measure of default risk based on Merton's (1974) model has proven empirically to be a strong predictor of default despite the simplifying underlying assumptions and it may be a result of its strong robustness to model misspecifications.

**Table 2:** Summary statistics of the data (224 banks in 32 countries)

VARIABLES	Observations	Mean	Std. dev.	Min.	Max.
Dummy for targeting ROE	2,285	0.26	0.44	0	1
ROE target	381	0.13	0.04	0.045	0.28
Return on equity (ROE)	2,256	0.051	0.40	-12.4	0.81
Return on assets (ROA)	2,259	-0.0004	0.31	-14.6	0.21
ROA volatility	1,984	0.005	0.012	2.0e-06	0.17
Equity-to-assets ratio	2,244	0.087	0.054	0.002	0.72
95% Value-at-Risk	1,948	0.032	0.026	0	0.35
Asset risk	1,118	0.54	0.19	0.086	1.19
Stock volatility	1,948	0.36	0.34	0.017	8.75
Default risk	1,338	0.26	0.37	0	1
Total assets (mn USD)	2,238	166,142	425,910	3.09	3.67e+06
Size ( $\ln(\text{Total assets})$ )	2,238	9.73	2.38	1.13	15.1
Top 5 FIVE holding	1,233	0.40	0.29	6.0e-07	1
Top 5 public holding	1,680	0.34	0.30	1.0e-07	1
Top 5 insider holding	996	0.037	0.10	1.0e-07	0.85
Top 5 institutional holding	1,688	0.12	0.16	1.0e-07	1
Non-performing loans	1,400	0.067	0.098	0.00039	0.95
Loan growth	2,245	0.28	7.56	-1.00	357
Loan concentration	1,360	0.52	0.22	0.004	1
Cost-to-income ratio	2,193	1.41	1.66	0.37	43.9
Risk-adjusted capital ratio	1,418	0.15	0.055	0.009	0.82
Market-to-book ratio	2,003	1.30	1.76	0.00056	24.4
Loan-to-deposit ratio	2,261	1.22	1.19	0.12	21.6
Dividend per share (DPS)	2,148	218	3,523	0	122,010
$\ln$ DPS	1,558	0.61	2.36	-7.60	11.7
Stock-based compensation	2,090	0.27	0.44	0	1
One-year stock return	1,903	-0.027	0.66	-6.87	7.60
Tax rate	1,892	0.28	0.81	6.60E-05	29.9
$\widehat{p1}_{target}$	785	0.32	0.36	1.0e-08	1
$\widehat{p2}_{target}$	771	0.32	0.36	0	1

This table displays the statistics of all variables in our analysis. *ROE target* is the level of the published target level. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *ROA volatility* is the volatility of quarterly ROAs during a year. *Asset risk* is valued as the ratio of total risk-adjusted assets to total assets. *95% Value-at-Risk* is the absolute value of the maximum daily return expected to be lost over a year, at 95% confidence level, calculated based on the historical method. *Stock volatility* is the yearly-based volatility of daily stock returns during a year. *Default risk* is calculated based on Merton's (1974) model that the equity of a firm is viewed as a call option on the firm's assets, in line with Black and Scholes's (1973) model, and by applying Vassalou and Xing's (2004) computing procedure with iterative estimation. *Size* is valued as the natural logarithm of total assets. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *Top 5 public holding*, *Top 5 insider holding*, and *Top 5 institutional holding* are the total percentage shareholdings of the largest five public, insider, and institutional shareholders, respectively. *Non-performing loans* is valued as the proportion of non-performing loans to total loans. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity.  *$\ln$ DPS* is the natural logarithm of *Dividend per share (DPS)*. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Tax rate* is the effective tax rate for a bank.  $\widehat{p1}_{target}$  is our model-implied bank-level probability of setting ROE target, used in our main analysis, while the alternative measure  $\widehat{p2}_{target}$  is used in the robustness checks. *Total assets* is in millions of US dollars and *Dividend per share (DPS)* is in dollars.

of risk, we have five blocks of variables for banks' characteristics. The first block consists of variables for ownership. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *Top 5 public holding*, *Top 5 insider holding*, and *Top 5 institutional holding* are the total percentage shareholdings of the largest five public, insider, and institutional shareholders, respectively. The second block is for asset valuation and management inefficiency. *Non-performing loans* is valued as the proportion of non-performing loans to total loans. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. The third block is for bank valuation and funding liquidity. Aforementioned *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Loan-to-deposit* ratio simply is the ratio of total loans to total deposits. The fourth block of variables is related to stocks. We have *Dividend per share (DPS)* in US dollars and its natural logarithm (*lnDPS*) in regressions. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. The last block is *Tax rate*, which is the effective tax rate for a bank.

As mentioned earlier, 26% of bank years, a target for ROE is set. The explicit and exact level of the target, when published, ranges from 4.5% to 28%, with an average of 13%. Notably, there is

a large variation for the measures of earning, i.e. ROE and ROA. At the bottom of the table, we have our predicted probabilities of setting target. The predicted probabilities are very close to true observation and have the full possible interval range between 0 and 100 percent. Other bank-level characteristics display plausible and relatively un-noteworthy distributions.

### **3. Methodology**

To understand banks' strategies regarding ROE targeting, we study not only the factors influencing a bank manager's decision on whether to set and publish a ROE target or not, but also those influencing whether to publish an explicit and specific level of the target or not. Moreover, the most important question to answer is how targeting ROE affects banks' risk taking in the following year. After a target for ROE is set, what would the manager do to achieve the goal? Would the manager be more pro to risky business for possible higher but volatile returns, or to work on leverage instead of enhancing the skills of generating higher returns from the assets pool? Would the change of the bank's risk profile induce higher default risk?

However, it is not the action of targeting ROE *per se* that leads to the possible change of the bank's risk profile, but the drives of management that influence the decision of targeting ROE. Therefore, we cannot just regress the dummy for whether a bank sets a target directly on banks' risk taking in the following year. Instead, we have a two-stage procedure. In the first stage, we use banks' characteristics at year  $t$  to explain their decisions on whether to set ROE targets at the end of the year; then in the second stage, we use the predicted probability of setting target in the first stage to explain banks' risk taking at year  $t + 1$ . In this way, we can also incorporate bank individual effect in the estimation of the probability of setting target, which is impossible with the universal dummy.

To sum up, we have the following two stages.

Stage 1, we have panel probit random-effect models to explain banks' decision on targeting ROE in Equation (1) and on the publishing of the exact target level in Equation (2).

$$Pr(G_{i,t} = 1) = \Phi\{\alpha + \beta'_G \mathbf{X}_{G,i,t} + C_i + \gamma_i\} \quad (1)$$

where  $G_{i,t}$  is an indicator that takes on unit value if a bank  $i$  has a target for ROE at time  $t$  and zero otherwise,  $\Phi$  is the standard normal cumulative distribution function,  $\mathbf{X}_{G,i,t}$  is a set of bank-level fundamentals that determine the likelihood of setting a target,  $C_i$  is for country fixed effects, and  $\gamma_i$  is for bank-level random effects (i.i.d. with distribution  $N(0, \sigma_\gamma^2)$ ).

$$Pr(L_{i,t} = 1 | G_{i,t} = 1) = \Phi\{\alpha + \beta'_L \mathbf{X}_{L,i,t} + \beta_{IMR} IMR_{G,i,t} + C_i + \gamma_i\} \quad (2)$$

where  $L_{i,t}$  takes on unit value if a bank  $i$  publishes some explicit and exact level of the target at time  $t$  and zero otherwise, and  $\mathbf{X}_{L,i,t}$  is a set of bank-level determinants for the likelihood of publishing an exact target level. Since the target level is observed only for banks with target, we follow the standard Heckman (1979) approach and calculate the inverse Mills ratio  $IMR_{G,i,t}$  based on the prediction from Equation (1) to control for the sample selection bias.

Stage 2, we have linear panel fixed-effect models to study the impact of targeting ROE on banks' risk taking in the following year.

$$R_{i,t+1} = \alpha + \beta_p \widehat{Pr(G_{i,t} = 1)} + \beta'_G \mathbf{X}_{G,i,t} + \beta'_R \mathbf{X}_{R,i,t} + \psi_t + \gamma_i + u_{i,t} \quad (3)$$

where  $R_{i,t+1}$  is a risk measure for bank  $i$  at time  $t + 1$ ,  $\widehat{Pr(G_{i,t} = 1)}$  is the predicted probability

of setting a target for ROE based on Equation (1),  $\mathbf{X}_{G,i,t}$  is the set of explanatory variables used to predict  $\widehat{Pr}(G_{i,t} = 1)$  in Stage 1,  $\mathbf{X}_{R,i,t}$  is a set of determinants of the banks' risk but not of the strategy of targeting ROE,  $\psi_t$  is for time fixed effects to control for common period shocks, and  $\gamma_i$  is for bank-level fixed effects. Having  $\mathbf{X}_{G,i,t}$  as a part of the explanatory variables is to make sure that  $\beta_p$  only captures the effect of targeting ROE on banks' risk rather than that of  $\mathbf{X}_{G,i,t}$ .

## 4. Results

### 4.1. The strategy of targeting ROE

As the first study on banks' actual practice of setting targets for ROE, we explore different aspects of the banks' strategy on targeting ROE. Firstly and most importantly, we investigate what determines a bank's choice of setting and publishing a target. Notice again that our data is limited to the extent that we can only observe the choice if it is published. So, the propensity of targeting ROE in our analysis is actually that of setting and publishing a target. Table 3 reports the results for this propensity, with different specifications of the model defined in Equation (1). For each specification, it reports both the coefficients of the explanatory variables and their marginal effects on the probability of setting a target at the mean. In addition, since the model is with bank random effect of the panel, it does capture variations between banks.

The significant determinants of targeting ROE are bank size (*Size*) and the concentration of controlling ownership (*Top 5 FIVE holding*). That big banks are more pro to target ROE might due to the valuable *put* option value of their liabilities, since big banks are more likely to receive explicit and implicit government support (See Haldane, 2009, 2010). This "too big to fail" phenomenon could add higher expected long-term growth and earnings to big banks, so that targeting ROE becomes an



**Table 3: Setting a target for ROE**

VARIABLES	(1)		(2)		(3)		(4)		(5)	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Size	0.55*** (0.11)	0.17*** (0.031)	0.60*** (0.12)	0.20*** (0.035)	0.58*** (0.13)	0.20*** (0.042)	0.62*** (0.14)	0.21*** (0.039)	0.40*** (0.085)	0.12*** (0.023)
Return on assets	0.0050 (0.10)	0.0016 (0.033)	33.4 (20.6)	10.9 (6.81)	12.7 (19.4)	4.41 (6.73)	50.5* (30.2)	17.0* (10.2)	-0.023 (0.100)	-0.0067 (0.030)
Loan-to-deposit ratio	-0.16 (0.18)	-0.051 (0.056)	-0.70** (0.34)	-0.23** (0.11)	-0.51* (0.28)	-0.18* (0.093)	-0.53 (0.33)	-0.18 (0.11)	-0.13 (0.13)	-0.040 (0.036)
Non-performing loans	7.12*** (2.55)	2.26*** (0.74)	4.84 (3.11)	1.58 (0.99)	3.27 (3.13)	1.13 (1.07)	3.22 (3.70)	1.08 (1.24)	5.34** (2.36)	1.58** (0.67)
Top 5 FIVE holding	1.50*** (0.57)	0.48*** (0.18)	1.67*** (0.58)	0.54*** (0.18)	1.28*** (0.49)	0.44*** (0.17)	1.34** (0.65)	0.45** (0.21)		
One-year stock return	0.19 (0.15)	0.060 (0.048)	0.30* (0.18)	0.097 (0.060)	0.23 (0.18)	0.079 (0.063)			0.16 (0.13)	0.048 (0.038)
Cost-to-income ratio										
Loan growth										
Risk-adjusted capital ratio					4.35 (4.53)	1.51 (1.54)				
Market-to-book ratio					0.077 (0.12)	0.027 (0.043)				
Stock-based compensation					0.065 (0.35)	0.023 (0.12)				
Tax rate							0.22 (0.44)	0.073 (0.14)		
lnDPS							-0.042 (0.15)	-0.014 (0.050)		
Top 5 public holding									0.37 (0.48)	0.11 (0.14)
Top 5 institutional holding									1.25 (1.03)	0.37 (0.30)
Country fixed-effect	YES		YES		YES		YES		YES	
Constant	-7.26*** (1.73)		-7.32*** (1.50)		-6.75*** (1.98)		-7.25*** (1.48)		-7.34*** (1.92)	
Observations	633		620		546		500		821	
Number of banks	112		111		106		101		133	
Pseudo R2	0.21		0.23		0.22		0.22		0.17	
Log likelihood	-220		-210		-196		-170		-294	
Chi2	250582		303976		102385		11546		437720	
Prob>Chi2	0		0		0		0		0	

This table reports the estimation on banks' propensity of setting and publishing ROE targets, with different specifications for Equation (1). *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Loan growth* is for the annual growth of net loans. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *Tax rate* is the effective tax rate for a bank. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. *Top 5 public holding* and *Top 5 institutional holding* are the total percentage shareholdings of the largest five public and institutional shareholders, respectively. In parenthesis are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

attractive strategy for big banks. Besides size, *Top 5 FIVE holding* is very significant in explaining the propensity of targeting ROE. This variable values the cash-flow rights of top five controlling stockholders who own more than five percent of the voting rights (so-called “FIVE”). So, banks with higher concentration of controlling ownership are more likely to target ROE. As consistent with the literature (See Shleifer and Vishny, 1997; La Porta et al., 2002)(more citation?), large controlling shareholders exercise their voting rights to control the management and therefore reduce the agency conflict between shareholders and the manager. This is consistent with the intuition that the bank manager set targets for ROE to serve the interests of shareholders. Since generating and returning returns to shareholders is one of the main elements of corporate governance, it is not only the controlling rights but also the cash-flow rights (captured by the “*Top 5*”) of the controlling owners that influence the decision-making of the manager. This is consistent with the literature that increases in the cash-flow rights of the controlling owners will reduce their expropriation of resources from the corporation, holding other factors constant (Burkart et al., 1997). The marginal effect of *Top 5 FIVE holding* is stable and around 0.5. This implies that its one standard deviation increase from mean increases the likelihood of targeting ROE from 20% to 35%. If we replace *Top 5 FIVE holding* with *Top 5 public holding* or *Top 5 institutional holding*, the explaining power reduces to essentially zero, as seen in specification (5). This exercise confirms that it is the controlling ownership that has the significant impact on the likelihood of targeting ROE.

As ROE is used as a measure for business performance and profitability, should the manager of a bank with good performance be more pro to set a target for ROE due to the advantaged within-bank information and confidence as sketched in the data description in Section 2? However, our regressions show that targeting ROE is not determined by the actual profitability, return on assets, which only shows up significant at 10% confidence level in one specification. The management

inefficiency (*Cost-to-income ratio*), which reflects the management skills of generating returns from the existing assets pool, does not significantly explain the propensity of targeting ROE. Controversially, targeting ROE is associated with low quality of loans (*Non-performing loans*). The negative and occasionally significant *Loan-to-deposit ratio* shows that targeting ROE is, to some extent, related to funding liquidity of the bank. Is targeting ROE used as signalling the bank's effort of generating returns for shareholders in order to attract external investors? Should targeting ROE be related to capital capacity and stock-related measurements? Our results show that capital adequacy (*Risk-adjusted capital ratio*), stock-market performance (*One-year stock return*), market valuation (*Market-to-book ratio*), and dividend payout (*lnDPS*) are not significant in explaining the likelihood of targeting ROE. Whether the bank has a stock-based incentive package for employees or managers (*Stock-based compensation*) does not determine the decision of targeting ROE either.

Second, we look into the different approaches of publishing targets by studying the likelihood of publishing explicit target levels<sup>6</sup>. As described in Section 2, only a portion (65.4%) of the targets are announced as some explicit and exact numbers. What determines the management's attitude toward the extent of conveying information to shareholders and the public? Table 4 reports the results for the propensity of announcing the target level. Since it is only for a sub-sample of banks with target, we follow Heckman (1979) approach and calculate the inverse Mills ratio (*Inverse Mills ratio (target)*) based on the prediction from Equation (1) to control for the sample selection bias, as explained in Section 3.

Similar to Table 3, we report both the coefficients and the marginal effects. Due to the limited resulting small sample here, we cannot have many explanatory variables in one specification.

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<sup>6</sup>As described in Section 2, due to the inconsistency of the observed target levels, we cannot investigate the actual levels further than their description.

**Table 4: Announcing the number of the target**

VARIABLES	(1)		(2)		(3)		(4)		(5)	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Top 5 insider holding	-13.8* (7.68)	-3.84* (2.04)	-14.6** (7.06)	-4.26** (1.96)	-12.3** (5.58)	-3.31** (1.36)	-16.4*** (5.60)	-4.41*** (1.18)		
One-year stock return	0.61* (0.34)	0.17* (0.091)	0.85*** (0.31)	0.25*** (0.087)	0.76*** (0.26)	0.21*** (0.071)	0.91** (0.39)	0.24** (0.10)		
Stock-based compensation	1.04 (0.76)	0.29 (0.23)	1.10 (0.69)	0.32 (0.21)	0.53 (0.48)	0.15 (0.14)	1.79** (0.82)	0.48* (0.26)		
Size			0.10 (0.20)	0.030 (0.059)			0.030 (0.25)	0.0081 (0.067)		
Return on assets			-3.03 (39.6)	-0.89 (11.6)			121 (114)	32.4 (27.3)		
Loan to deposit ratio	0.38 (0.70)	0.10 (0.19)			0.020 (0.66)	0.0055 (0.18)				
Cost-to-income ratio	-1.52*** (0.54)	-0.42** (0.17)			-1.31*** (0.50)	-0.35** (0.16)				
Loan growth	-0.97 (1.82)	-0.27 (0.52)			2.45 (2.23)	0.66 (0.61)				
Risk-adjusted capital ratio			7.18** (2.96)	2.10** (0.92)			7.44** (3.45)	2.00* (1.17)		
Market-to-book ratio			-0.047 (0.071)	-0.014 (0.020)			0.068 (0.067)	0.018 (0.020)		
Top 5 FIVE holding										
Top 5 institutional holding										
lnDPS					0.30 (0.22)	0.080 (0.059)	0.34 (0.29)	0.090 (0.086)		
Inverse Mills ratio (target)	-4.61 (3.75)	-1.28 (1.03)	-1.16 (4.25)	-0.34 (1.24)	-2.62 (2.28)	-0.73 (0.65)	-6.41** (2.91)	-1.78 (1.34)		
Country fixed-effect	YES		YES		YES		YES			
Constant	3.75 (2.75)		-1.97 (4.32)		1.41 (1.44)		4.02 (5.05)	0.31 (5.05)		
Observations	166		160		217		142	135		
Number of banks	38		38		49		32	32		
Pseudo R2	0.22		0.19		0.12		0.23	0.27		
Log likelihood	-69.4		-69.5		-95.8		-56.4	-51.1		
Chi2	5743		2811		18865		4100	4262		
Prob>Chi2	0		0		0		0	0		

This table reports the estimation on banks' propensity of publishing the explicit and exact target levels, with different specifications for Equation (2). *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a company's stock. *Top 5 insider holding* and *Top 5 institutional holding* are the total percentage shareholdings of the largest five insider and institutional shareholders, respectively. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Loan growth* is for the annual growth of net loans. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. *Inverse Mills ratio (target)* is the inverse Mills ratio calculated following Heckman (1979) approach, based on the prediction from Equation (1), to control for the sample selection bias. In parenthesis are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

Nevertheless, the results show that the insider ownership (*Top 5 insider holding*) and stock market performance (*One-year stock return*) are consistently significant in explaining the likelihood of announcing the exact target levels. It is intuitive that banks with higher stock returns are more likely to announce the target levels. This implies that the managers are pro to believe in the momentum of the booming economy. However, banks with higher concentration of insider holdings (*Top 5 insider holding*) are less likely to announce the target levels. According to the theory of information asymmetry and signalling, the bank's insiders have more and accurate information of the bank than outsiders, and attempt to signal bank quality to the market. Yet, our results indicate that the insiders are against of signalling to the market when they hold more cash-flow rights of the stocks. This is in line with agency theory that insiders have conflicts of interests with other shareholders. The agency considerations rather than signalling as the main motive of targeting ROE is very similar to dividend payout policy (See Lintner, 1956; DeAngelo et al., 2004, 2006; Leary and Michaely, 2011; Michaely and Roberts, 2012; Farre-Mensa et al., 2014). Evidenced in our data, the dominance of agency consideration is amplified when we control for the payout policy (*lnDPS*) in specification (4) and (5), where the negative impact of *Top 5 insider holding* becomes more significant compared to specification (1) and (2), respectively. When we replace the insider ownership with *Top 5 FIVE holding* and *Top 5 institutional holding*, we loose the significant explaining power of ownership.

In addition, the propensity of announcing the target level is also influenced negatively by the management inefficiency (*Cost-to-income ratio*) and positively by the capital capacity (*Risk-adjusted capital ratio*). These findings do reflect that the bank manager publishes an explicit and exact target level due to the confidence of good management skills and no urgency of raising capital.

#### *4.2. Risk taking in the following year*

The more important aspect of this study is the impact of targeting ROE on banks' following risk taking. As banks serve the broad economy by providing financing liquidity, how banks' business strategy influences their choices of management, allocation of resources, capital structure, and eventually default risk matters not only for the banking sector but also the whole economy. How would bank manager reach the target set in the previous year? What is the amplification of the reaching-for-target actions? We use the motives of setting ROE target to capture their ramification on the banks' risk taking in the following year, i.e. the impact of the probability of targeting ROE from Equation 1, as explained in Section 3.

According to Haldane's (2009) observations, banks lever up their balance sheets rather than enhance their management skills to generate returns on assets, in order to compete with their competitors. Then the obvious choice is to first study the impact of targeting ROE on banks' volatility of quarterly returns on assets and leverage in the following year, where results are presented in Table 5 and 6, respectively. Here, as well as for all the models for banks' risk taking, parameter estimates are reported with bootstrapped standard errors to control for the measurement error, since the likelihood of targeting ROE is predicted rather than observed true value. Table 5 shows that the estimated probability of targeting ROE significantly explains ROA volatility but not when we control the dividend payout. Meanwhile, Table 6 says that the leverage is not influenced by the strategy of targeting ROE unless dividend payout is controlled. We also check the robustness of the results with different predictions of the probability of targeting ROE (Table B3 and B4 in Appendix B demonstrate the results with an alternative prediction based on the second specification in Table 3). An overview is that, when banks become more likely to target ROE, they become more

**Table 5: ROA volatility in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1}_{target}$	1.81** (0.79)	2.19** (0.91)	2.11** (1.04)	0.11 (1.00)	0.13 (1.00)	-0.21 (1.29)
Size	-0.0012 (0.14)	0.043 (0.18)	-0.0044 (0.22)	0.046 (0.12)	-0.024 (0.11)	-0.014 (0.16)
Return on assets	9.90 (6.71)	12.0 (8.29)	11.4 (7.68)	9.69 (10.5)	15.3 (11.2)	15.8 (12.6)
Loan-to-deposit ratio	0.0048 (0.14)	0.073 (0.26)	0.0041 (0.17)	-0.23 (0.34)	-0.32 (0.34)	-0.28 (0.33)
Non-performing loans	0.43 (1.46)	0.070 (1.69)	0.0088 (1.91)	0.80 (1.61)	1.01 (1.67)	0.56 (2.03)
Top 5 FIVE holding	-0.37 (0.29)	-0.75 (0.47)	-1.00* (0.57)	-0.29 (0.27)	-0.51 (0.34)	-0.81* (0.46)
One-year stock return	0.13 (0.13)	0.10 (0.14)	0.12 (0.14)	-0.32*** (0.11)	-0.32*** (0.10)	-0.27*** (0.10)
Cost-to-income ratio		0.011 (0.11)			0.18 (0.12)	
Loan growth		-0.048 (0.11)			0.11 (0.14)	
Loan concentration	0.36* (0.21)			0.13 (0.22)		
Risk-adjusted capital ratio			0.65 (1.45)			0.38 (1.16)
Market-to-book ratio			-0.16** (0.080)			-0.089 (0.063)
Stock-based compensation			0.12 (0.097)			0.12 (0.11)
lnDPS				-0.034 (0.035)	-0.016 (0.033)	-0.033 (0.039)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	-0.43 (1.50)	-0.72 (1.71)	0.27 (2.07)	-0.26 (1.27)	0.32 (1.19)	0.93 (1.70)
Observations	581	643	568	423	477	406
R squared	0.075	0.063	0.074	0.092	0.094	0.111
Number of banks	110	126	119	87	102	97
Chi2	43.4	41.8	36	27.8	29.3	25.3
Prob>Chi2	0.0011	0.0030	0.022	0.12	0.11	0.28

This table represents the estimation of bank fixed-effect panel model for banks' volatility of quarterly returns on assets in the following year, with different specifications for Equation (3). *ROA volatility* is in percentage. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

**Table 6: Equity ratio in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1}_{target}$	1.08 (1.89)	1.32 (1.92)	1.05 (1.88)	-2.43* (1.41)	-2.62* (1.48)	-2.47* (1.44)
Size	-0.94* (0.51)	-0.66 (0.60)	-0.69 (0.61)	0.20 (0.41)	0.49 (0.56)	0.55 (0.58)
Return on assets	41.2*** (10.0)	49.8*** (10.4)	49.3*** (10.4)	47.2*** (12.6)	59.2*** (16.2)	60.8*** (14.8)
Loan-to-deposit ratio	-0.075 (0.54)	0.052 (0.59)	-0.038 (0.62)	0.76* (0.43)	0.96** (0.48)	0.95* (0.52)
Non-performing loans	-0.31 (4.12)	-0.81 (4.32)	-0.83 (4.32)	6.61 (4.25)	6.69 (4.14)	6.45 (4.17)
Top 5 FIVE holding	-0.55 (0.86)	-0.16 (0.72)	-0.28 (0.79)	1.01 (0.69)	1.31** (0.64)	1.14* (0.62)
One-year stock return	-0.35*** (0.11)	-0.40*** (0.12)	-0.36*** (0.10)	-0.35* (0.18)	-0.36* (0.20)	-0.31 (0.19)
Loan growth	-0.52* (0.28)	-0.78** (0.37)	-0.73** (0.36)	-0.93** (0.44)	-1.28** (0.56)	-1.25** (0.54)
Loan concentration	-1.75** (0.69)			-1.02 (0.81)		
Cost-to-income ratio		0.0074 (0.15)			0.018 (0.26)	
Market-to-book ratio			-0.098 (0.13)			-0.10 (0.14)
Stock-based compensation			-0.11 (0.20)			-0.24 (0.22)
lnDPS				0.012 (0.12)	-0.00029 (0.12)	-0.010 (0.12)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	17.8*** (5.25)	13.8** (5.85)	14.4** (6.24)	5.07 (4.53)	1.36 (5.77)	1.03 (6.19)
Observations	637	699	709	450	505	508
Number of banks	111	127	127	87	102	102
R-squared	0.33	0.31	0.31	0.48	0.44	0.45
Chi2	138	126	121	206	176	174
Prob>Chi2	0	0	0	0	0	0

This table represents the estimation of bank fixed-effect panel model for banks' equity-to-assets ratio in the following year, with different specifications for Equation (3). *Equity ratio* is in percentage. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.



committed to enhance their management skills in order to generate high returns on assets and hence this leads to higher volatility of quarterly earnings. However, for the banks paying our dividends, leveraging up their balance sheets becomes a short cut to achieve a high return on equity. A possible mechanism is the automatic consequence of paying out more dividends which reduces the amount of equity, but the effect of *lnDPS* on equity ratio is essentially zero. Furthermore, we replace *lnDPS* by a dummy indicating paying out positive dividends or not, and also run the sub-sample of banks paying positive dividends. Yet, the results remain the same (See Table B1 and B2 in Appendix B). Although this type of checks are limited, they do convey that the effect of targeting ROE on leverage is not completely results of higher outflows of retained earnings and equity. However, this outflow could constrain banks' investment in projects with positive net present values (NPV), which generate returns on assets, since literature documents that dividends payout policy is sticky and managers would forgo positive NPV projects before cutting dividends (See Lintner, 1956; Brav et al., 2005). This could be one explanation of insignificant effect of targeting ROE on ROA volatility for these banks.

ROA volatility measures the risk of the materialized earnings from the existing assets pool. While, beforehand this realized earning risk, there is a risk associated with how banks choose asset allocations, i.e. the composition of the assets pool, differently. We measure asset risk by the ratio of total risk-weighted assets to total assets. The results reported in Table A1 in Appendix A review that there is no significant effect of targeting ROE on banks' asset risk, i.e. banks' assets are not significantly tilted to high-risk assets following a higher probability of targeting ROE.

Since the strategy of targeting ROE serves the interests of the shareholders, we also examine how the propensity of targeting ROE affects the banks' stocks. First, we measure each stock's Value-at-Risk at 95% confidence level (*95% Value-at-Risk*, loss as absolute value) based on daily

**Table 7: 95% Value-at-Risk in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1}_{target}$	5.92*	6.83*	5.84*	-2.23	-2.08	-1.94
	(3.40)	(3.77)	(3.21)	(2.12)	(2.08)	(1.90)
Size	-0.34	0.54	-0.19	0.48	0.85	0.79
	(0.77)	(0.71)	(0.64)	(0.69)	(0.60)	(0.54)
Return on assets	-8.73	-12.9	-5.91	16.7	25.1	28.5*
	(19.7)	(18.1)	(16.6)	(19.2)	(16.5)	(15.4)
Loan-to-deposit ratio	0.78*	0.74**	0.79*	0.52	0.58	0.63
	(0.41)	(0.29)	(0.41)	(0.59)	(0.46)	(0.48)
Non-performing loans	1.15	-1.42	1.67	4.47	5.63	4.80
	(2.80)	(3.10)	(2.77)	(4.80)	(4.88)	(4.40)
Top 5 FIVE holding	0.26	-0.11	0.0047	0.92	1.09	0.83
	(0.89)	(0.87)	(0.83)	(0.67)	(0.67)	(0.65)
One-year stock return	0.094	0.088	0.040	-0.60**	-0.76***	-0.64***
	(0.69)	(0.72)	(0.64)	(0.24)	(0.24)	(0.23)
Stock-based compensation	0.47***	0.35**	0.49***	0.33*	0.33*	0.34*
	(0.18)	(0.16)	(0.17)	(0.20)	(0.18)	(0.18)
Loan concentration	0.49			0.86		
	(0.91)			(0.78)		
Loan growth	-0.18			-0.029		
	(0.54)			(0.42)		
Market-to-book ratio		0.032			0.21	
		(0.20)			(0.16)	
lnDPS				-0.42***	-0.42***	-0.44***
				(0.15)	(0.12)	(0.14)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	2.84	-5.85	1.35	-4.53	-8.65	-7.62
	(7.58)	(7.11)	(6.32)	(7.55)	(6.47)	(5.72)
Observations	631	702	704	446	504	504
Number of banks	111	127	127	87	102	102
Within R-squared	0.26	0.23	0.26	0.62	0.61	0.61
Chi2	242	259	228	553	685	506
Prob>Chi2	0	0	0	0	0	0

This table represents the estimation of bank fixed-effect panel model for banks' Value-at-Risk at 95% confidence level in the following year, with different specifications for Equation (3). 95% Value-at-Risk is the absolute value of the maximum daily return expected to be lost over a year, at 95% confidence level, calculated based on the historical method. It is in percentage here. Size is the natural logarithm of total assets valued as millions of US dollars. Non-performing loans represents the proportion of non-performing loans to total loans. Top 5 FIVE holding is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. One-year stock return is the carry-trade return from the end of the previous year to that of current year. Stock-based compensation is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. Loan concentration is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. Loan growth is for the annual growth of net loans. Market-to-book ratio is the ratio of market capitalization to the book value of common equity. lnDPS is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

stock returns using the historical method. This gives an indication of the maximum daily return expected to be lost over a year, a tail risk, at 95% confidence level.

The results, presented in Table 7, review that stocks' Value-at-Risk becomes higher following the issuers' higher likelihood of targeting ROE. Since equity is viewed as *call* option of the underlying assets, higher tail risk of the stock could result from more volatile valuation of assets due to higher ROA volatility (See Table 5). It signals that investors evaluate the strategy of targeting ROE risky. However, this effect is negative but not significant for issuers paying out dividends, where the amount of dividends paid out and the earning of the stocks have negative influence on the tail loss. This, on the other hand, shows that investors favour stocks paying dividends. Notice that the indication of stock-based compensation has a positive and significant impact on this tail risk. This is consistent with the literature that stockholders take more risk than managers (See Galai and Masulis, 1976; Merton, 1977; Keeley, 1990; Esty, 1998) and higher proportion of stock owned by managers increases bank risk (Saunders et al., 1990).

Second, we also measure each stock's volatility of daily returns within a year. Although targeting ROE has different influences for all banks and those paying dividends, but neither is statistically significant (See Table A2 in Section A).

As shown, as of now, targeting ROE has impact on the risk measures of both banks' assets and liabilities, to different extent for different groups of banks. It becomes natural to take into account both sides and calculate default risk as an overall risk measure. Our measure of default risk, within a year, is calculated based on Merton's (1974) model that the equity of a firm is viewed as a call option on the firm's assets, in line with Black and Scholes's (1973) model. In terms of methodology, we follow Vassalou and Xing's (2004) computing procedure with iterative estimation.

The results in Table 8 demonstrate that banks that payout dividends and become more pro

**Table 8:** Default risk in the following year

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1}_{target}$	-0.42 (0.57)	-0.45 (0.57)	-0.37 (0.56)	-1.13* (0.61)	-1.00* (0.57)	-1.38** (0.66)
Size	-0.11 (0.14)	-0.069 (0.14)	-0.056 (0.13)	-0.034 (0.18)	-0.063 (0.13)	0.0081 (0.15)
Return on assets	-3.16 (4.03)	-4.64 (3.73)	-5.15 (3.40)	-10.8* (5.90)	-3.03 (6.60)	-12.6** (5.98)
Loan-to-deposit ratio	0.030 (0.078)	-0.055 (0.13)	0.031 (0.070)	-0.046 (0.13)	-0.066 (0.11)	-0.015 (0.11)
Non-performing loans	0.47 (1.46)	0.052 (1.37)	0.42 (1.40)	5.52*** (1.73)	4.15*** (1.39)	5.47*** (1.67)
Top 5 FIVE holding	0.71** (0.30)	0.65** (0.25)	0.69*** (0.23)	0.57* (0.31)	0.66*** (0.25)	0.58* (0.32)
One-year stock return	-0.035 (0.048)	-0.040 (0.052)	-0.049 (0.048)	-0.0084 (0.070)	-0.038 (0.056)	-0.020 (0.063)
Loan growth		-0.010 (0.099)			0.031 (0.10)	
Loan concentration	0.15 (0.27)			-0.052 (0.42)		
Cost-to-income ratio		0.0054 (0.046)			0.34*** (0.093)	
Market-to-book ratio			0.031 (0.034)			0.019 (0.041)
Stock-based compensation			0.079 (0.075)			0.089 (0.088)
lnDPS				0.053 (0.045)	0.066* (0.036)	0.061 (0.039)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	1.71 (1.53)	1.46 (1.44)	1.14 (1.34)	1.32 (2.04)	0.97 (1.48)	0.79 (1.66)
Observations	339	372	380	254	283	286
Number of banks	75	84	84	60	68	68
R-squared	0.45	0.43	0.43	0.58	0.59	0.55
Chi2	136	120	165	210	276	248
Prob>Chi2	0	0	0	0	0	0

This table represents the estimation of bank fixed-effect panel model for banks' default risk in the following year, with different specifications for Equation (3). *Default risk* is calculated based on Merton's (1974) model that the equity of a firm is viewed as a call option on the firm's assets, in line with Black and Scholes's (1973) model, and by applying Vassalou and Xing's (2004) computing procedure with iterative estimation. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

to target ROE are less likely to default in the coming year. Since the calculation of default risk uses equity data to infer the market value and volatility of the underlying assets, the possible over-valuation of the stocks paying out dividends due to the signalling effect (see literature ???) might have contributed to the negative effect of targeting ROE on default risk. Nevertheless, our results testify that targeting ROE does increase banks' risks in certain dimensions as shown in Table 5, 6 and 7, but not default risk. Yet, the concentrated controlling ownership (*Top 5 FIVE holding*) has positive and significant impact on default risk. More control over management by the concentrated controlling owners could have amplified the risk-taking appetite of stockholders to managers.

## **5. Conclusion**

Since banks actively use ROE as a measure of performance and profitability, but are frequently criticized for leveraging up their balance sheets rather than enhancing management skills in extracting profits from the assets pool, in order to compete with their competitors (See Haldane, 2009; Pagratis et al., 2014), it becomes necessary to investigate how banks do in terms of targeting ROE in practice. Further more, what deemed as more important is the ramification of the reaching-for-ROE on banks' risk taking, due to the importance of the banking industry and banks' excess risk taking ahead of the recent global financial crisis.

Our dataset is consisted of unique hand-collected data on the strategy of targeting return on equity by 224 public commercial banks in Europe from 1995 to 2016, and various measures of banks' risk on both the asset and liability sides and the overall default risk.

Our results demonstrate the importance of the banks' ownership structure in the targeting-ROE context. More specifically, concentrated controlling ownership is linked to banks' desire for targeting

ROE and concentrated insider ownership is linked to the manager's attitude toward the extent of information to be published regarding targeting ROE. The more likely a bank targets ROE, the riskier the bank is in terms of volatility of quarterly returns on assets and Value-at-Risk of stocks in the following year. However, this impact differs for banks paying dividends that leveraging up their balance sheets becomes a short cut to achieve a high return on equity but the overall default risk becomes lower.

Since targeting ROE is a managerial strategy aiming at serving the interests of shareholders, it is a materialization of the comparative power of stockholders within the corporate governance structure of the bank, which is important for banks' decision of resource allocation, capital structure, risk profile, and etc. Our study contributes not only to the deep understanding of the reaching-for-ROE itself, but also the link between bank corporate governance and risk taking. It is also highly relevant for policy making regarding bank regulation. Yet, there is limitation of the public available data, especially the inconsistent target levels. Further studies on this topic with different data and aspects are desired.

## Appendix

### A. Other risk measures

This section includes the tables for the estimation of the model in Equation 3 with *Asset risk* and *Stock volatility* as the risk measure.

### B. Robustness check

This section includes tables reporting the results of robustness checks. Here we report the estimation results for volatility of quarterly returns on assets and equity ratio as the representatives. Subsection B.1 includes tables for the estimations for both the whole sample with a dummy indicating dividend payout and the sub sample of banks paying out dividends. Subsection B.2 includes tables for the estimation with an alternative predicted likelihood of targeting ROE ( $\widehat{p2_{target}}$ ) based on the second specification in Table 3.

#### *B.1. Dividend payout*

#### *B.2. Alternative predicted probability of targeting ROE*

**Table A1: Asset risk in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1}_{target}$	11.7 (9.82)	13.1 (9.60)	11.4 (9.52)	23.8 (18.8)	19.0 (17.4)	16.9 (21.0)
Size	-4.85** (2.22)	-4.51** (2.28)	-4.91** (2.09)	-3.14 (4.43)	-0.42 (4.14)	-2.37 (4.55)
Return on assets	37.1 (51.4)	46.9 (51.0)	91.7** (40.0)	-174 (167)	-96.2 (166)	35.8 (92.1)
Loan-to-deposit ratio	-0.16 (1.77)	0.11 (2.03)	0.054 (1.34)	4.06 (3.91)	6.09 (4.07)	3.63 (3.07)
Non-performing loans	-18.6 (14.4)	-18.9 (14.7)	-16.2 (15.5)	-16.5 (38.3)	-11.3 (44.5)	-12.2 (50.0)
Top 5 FIVE holding	3.40 (6.56)	2.68 (5.34)	-1.79 (4.62)	1.71 (9.06)	1.87 (8.36)	-6.17 (9.07)
One-year stock return	-0.88 (0.65)	-0.77 (0.70)	-1.43** (0.67)	-1.79 (1.38)	-1.25 (1.25)	-1.86 (1.53)
Cost-to-income ratio		-0.024 (0.43)			-1.51 (1.89)	
Loan growth		0.49 (1.57)			-2.00 (3.32)	
Loan concentration	-14.1** (6.80)			-18.5** (8.05)		
Risk-adjusted capital ratio			-60.5*** (13.1)			-66.0*** (16.9)
Market-to-book ratio			0.55 (0.75)			0.38 (1.03)
Stock-based compensation			-0.62 (1.15)			-1.20 (1.25)
lnDPS				0.93 (0.89)	1.13 (0.97)	1.10 (0.84)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	102*** (23.6)	93.2*** (25.6)	110*** (21.3)	78.8 (48.4)	44.0 (44.4)	77.9* (46.9)
Observations	420	459	439	294	328	308
Number of banks	86	100	95	67	80	78
R-squared	0.37	0.33	0.38	0.37	0.31	0.39
Chi2	109	104	135	87.1	70.3	98.7
Prob>Chi2	0	0	0	2.4e-10	3.1e-07	0

This table represents the estimation of bank fixed-effect panel model for banks' asset risk in the following year, with different specifications for Equation (3). *Asset risk* is the ratio of total risk-weighted assets to total assets, in percentage here. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.



**Table A2: Stock volatility in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1}_{target}$	27.8 (32.2)	38.0 (37.2)	25.8 (30.7)	-11.8 (33.4)	-14.4 (26.9)	-11.8 (28.6)
Size	-12.7 (8.95)	2.71 (7.88)	-8.90 (7.70)	-1.11 (7.26)	5.39 (5.84)	4.26 (6.68)
Return on assets	-132 (187)	-206 (147)	-108 (143)	149 (336)	197 (234)	259 (266)
Loan-to-deposit ratio	6.73 (4.58)	6.91* (3.63)	7.40 (4.89)	4.92 (7.15)	6.56 (6.35)	7.59 (6.62)
Non-performing loans	32.7 (33.3)	2.76 (28.3)	37.4 (35.0)	43.1 (45.2)	60.3 (41.6)	45.1 (41.6)
Top 5 FIVE holding	20.9 (14.4)	14.3 (14.6)	13.9 (13.0)	14.1* (8.30)	18.3* (9.68)	13.6* (7.49)
One-year stock return	-4.97 (4.94)	-4.88 (4.94)	-5.19 (4.87)	-11.1** (4.62)	-12.4*** (4.56)	-10.4*** (3.97)
Stock-based compensation	8.85** (4.05)	7.17** (3.56)	9.42** (3.73)	3.06 (2.59)	3.22 (2.22)	3.56 (2.48)
Loan concentration	-10.5 (13.9)			-6.10 (16.3)		
Loan growth	0.98 (4.81)			4.72 (4.32)		
Market-to-book ratio		3.24 (2.71)			3.77 (2.85)	
lnDPS				-6.09** (2.67)	-5.63** (2.21)	-5.99*** (2.24)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	134 (90.3)	-32.3 (80.7)	90.2 (76.5)	24.7 (81.6)	-56.7 (65.3)	-37.7 (72.6)
Observations	631	702	704	446	504	504
Number of banks	111	127	127	87	102	102
R-squared	0.35	0.25	0.33	0.46	0.45	0.44
Chi2	134	177	168	372	380	413
Prob>Chi2	0	0	0	0	0	0

This table represents the estimation of bank fixed-effect panel model for banks' stock volatility in the following year, with different specifications for Equation (3). *Stock volatility* is the yearly-based volatility of daily stock returns during a year, in percentage here. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Loan growth* is for the annual growth of net loans. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

**Table B1: ROA volatility in the following year**

VARIABLES	The whole sample			For banks paying dividends		
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\rho}_{1target}$	1.81** (0.77)	2.18** (0.89)	2.09** (0.97)	0.15 (0.97)	0.14 (0.97)	-0.14 (1.26)
Size	-0.00071 (0.14)	0.043 (0.18)	-0.0012 (0.21)	0.038 (0.12)	-0.028 (0.11)	-0.019 (0.16)
Return on assets	10.0 (7.43)	12.2 (8.88)	11.7 (8.14)	8.48 (9.42)	14.9 (10.3)	14.5 (11.0)
Loan-to-deposit ratio	0.0049 (0.13)	0.074 (0.27)	0.0045 (0.14)	-0.23 (0.34)	-0.32 (0.32)	-0.29 (0.33)
Non-performing loans	0.44 (1.40)	0.082 (1.51)	0.037 (2.00)	0.86 (1.68)	1.03 (1.82)	0.61 (2.33)
Top 5 FIVE holding	-0.37 (0.31)	-0.75 (0.46)	-1.00* (0.59)	-0.33 (0.27)	-0.53 (0.34)	-0.84* (0.48)
One-year stock return	0.13 (0.13)	0.10 (0.14)	0.12 (0.15)	-0.32*** (0.11)	-0.32*** (0.11)	-0.28** (0.11)
Cost-to-income ratio		0.011 (0.099)			0.19 (0.12)	
Loan growth		-0.050 (0.12)			0.11 (0.15)	
Loan concentration	0.36* (0.21)			0.15 (0.24)		
Risk-adjusted capital ratio			0.68 (1.51)			0.45 (1.09)
Market-to-book ratio			-0.16* (0.083)			-0.088 (0.067)
Stock-based compensation			0.12 (0.091)			0.12 (0.11)
Dummy for paying dividend	-0.0099 (0.082)	-0.021 (0.098)	-0.029 (0.095)			
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	-0.42 (1.39)	-0.71 (1.75)	0.26 (2.04)	-0.19 (1.30)	0.34 (1.13)	0.95 (1.60)
Observations	581	643	568	423	477	406
R squared	0.075	0.063	0.074	0.090	0.094	0.110
Number of banks	110	126	119	87	102	97
Chi2	44.4	44.3	39.8	22.7	31.5	23.3
Prob>Chi2	0.0013	0.0021	0.011	0.25	0.049	0.33

This table represents the estimation of bank fixed-effect panel model for banks' volatility of return on assets in the following year for the whole sample and the sub sample of banks paying out dividends. *ROA volatility* is in percentage. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

**Table B2: Equity ratio in the following year**

VARIABLES	The whole sample			For banks paying dividends		
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{pl}_{target}$	1.11 (1.87)	1.33 (2.05)	1.08 (1.91)	-2.44* (1.43)	-2.62* (1.41)	-2.46 (1.55)
Size	-0.95* (0.52)	-0.66 (0.60)	-0.69 (0.65)	0.20 (0.41)	0.49 (0.52)	0.54 (0.52)
Return on assets	38.5*** (10.3)	49.2*** (10.8)	48.1*** (9.94)	47.7*** (12.7)	59.2*** (15.1)	60.4*** (14.1)
Loan-to-deposit ratio	-0.075 (0.54)	0.052 (0.59)	-0.038 (0.61)	0.76* (0.42)	0.96** (0.47)	0.95** (0.48)
Non-performing loans	-0.36 (3.95)	-0.83 (4.32)	-0.88 (4.41)	6.59* (3.86)	6.69* (3.99)	6.47 (4.22)
Top 5 FIVE holding	-0.56 (0.82)	-0.16 (0.77)	-0.29 (0.74)	1.03 (0.66)	1.31** (0.64)	1.13* (0.60)
One-year stock return	-0.35*** (0.12)	-0.40*** (0.12)	-0.36*** (0.11)	-0.35* (0.19)	-0.36* (0.20)	-0.32 (0.20)
Loan growth	-0.50* (0.28)	-0.77** (0.39)	-0.71** (0.35)	-0.93** (0.41)	-1.28** (0.53)	-1.25** (0.51)
Loan concentration	-1.75*** (0.65)			-1.03 (0.79)		
Cost-to-income ratio		0.0080 (0.15)			0.018 (0.26)	
Market-to-book ratio			-0.099 (0.13)			-0.10 (0.15)
Stock-based compensation			-0.11 (0.20)			-0.24 (0.22)
Dummy for paying dividend	0.18 (0.19)	0.056 (0.19)	0.099 (0.19)			
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	17.7*** (5.30)	13.7** (5.84)	14.4** (6.58)	5.04 (4.45)	1.36 (5.46)	1.04 (5.58)
Observations	637	699	709	450	505	508
Number of banks	111	127	127	87	102	102
R-squared	0.33	0.31	0.31	0.48	0.44	0.44
Chi2	138	110	115	201	176	179
Prob>Chi2	0	0	0	0	0	0

This table represents the estimation of bank fixed-effect panel model for banks' equity-to-assets ratio in the following year, for the whole sample and the sub sample of banks paying out dividends. *Equity ratio* is in percentage. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

**Table B3: ROA volatility in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p2}_{target}$	2.12*** (0.73)	1.75** (0.76)	2.07** (0.87)	0.014 (0.74)	-0.14 (0.75)	-0.57 (0.90)
Size	0.037 (0.17)	0.036 (0.15)	0.025 (0.19)	-0.020 (0.11)	0.0059 (0.13)	-0.035 (0.15)
Return on assets	2.69 (9.01)	3.55 (8.77)	4.17 (9.46)	15.1 (11.4)	14.1 (10.9)	22.0 (14.0)
Loan-to-deposit ratio	0.25 (0.27)	0.051 (0.22)	0.26 (0.30)	-0.32 (0.36)	-0.30 (0.38)	-0.40 (0.39)
Non-performing loans	1.49 (1.33)	1.57 (1.31)	1.39 (1.54)	1.08 (1.49)	0.81 (1.54)	0.47 (1.58)
Top 5 FIVE holding	-0.85* (0.51)	-0.40 (0.34)	-0.99* (0.60)	-0.50 (0.34)	-0.27 (0.31)	-0.73 (0.46)
One-year stock return	0.044 (0.14)	0.088 (0.14)	0.075 (0.15)	-0.32*** (0.10)	-0.31*** (0.11)	-0.27** (0.10)
Cost-to-income ratio	-0.0016 (0.099)	0.0016 (0.10)	0.00091 (0.10)	0.18 (0.13)	0.22 (0.14)	0.25* (0.14)
Loan growth	0.027 (0.11)	0.072 (0.12)	0.034 (0.12)	0.11 (0.13)	0.099 (0.16)	0.084 (0.17)
Loan concentration		0.30 (0.22)			0.15 (0.22)	
Risk-adjusted capital ratio			0.95 (1.45)			0.83 (1.22)
Market-to-book ratio			-0.16* (0.084)			-0.073 (0.060)
Stock-based compensation			0.12 (0.092)			0.13 (0.10)
lnDPS				-0.017 (0.036)	-0.023 (0.037)	-0.020 (0.040)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	-0.82 (1.69)	-0.87 (1.53)	-0.37 (2.03)	0.30 (1.14)	-0.094 (1.64)	0.83 (1.66)
Observations	643	571	560	477	420	404
Number of banks	126	110	119	102	87	97
R squared	0.066	0.080	0.077	0.094	0.10	0.12
Chi2	37.2	34.7	41.2	29.8	32.5	32.2
Prob>Chi2	0.011	0.030	0.011	0.097	0.069	0.12

This table represents the estimation of bank fixed-effect panel model for banks' volatility of return on assets in the following year, with an alternative predicted likelihood of targeting ROE ( $\widehat{p2}_{target}$ ) based on the second specification in Table 3. *ROA volatility* is in percentage. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Risk-adjusted capital ratio* is the ratio of capital to total risk-adjusted assets. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

**Table B4: Equity ratio in the following year**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p2}_{target}$	-0.037 (1.57)	0.63 (1.54)	-0.042 (1.55)	-2.05* (1.11)	-1.63 (1.09)	-1.92* (1.12)
Size	-0.62 (0.66)	-0.92* (0.53)	-0.64 (0.69)	0.48 (0.55)	0.16 (0.42)	0.54 (0.61)
Return on assets	48.8*** (13.0)	37.2** (14.6)	48.9*** (13.5)	70.5*** (15.4)	60.1*** (14.1)	71.4*** (14.6)
Loan-to-deposit ratio	0.050 (0.60)	-0.012 (0.59)	0.035 (0.57)	0.83* (0.49)	0.67 (0.48)	0.84* (0.48)
Non-performing loans	0.31 (3.50)	0.28 (3.24)	0.030 (3.40)	5.71 (3.69)	5.51 (3.61)	5.55 (3.71)
Top 5 FIVE holding	0.021 (0.72)	-0.42 (0.80)	-0.031 (0.74)	1.37** (0.61)	1.04 (0.66)	1.20* (0.67)
One-year stock return	-0.37** (0.14)	-0.37*** (0.14)	-0.34** (0.14)	-0.35* (0.20)	-0.35* (0.18)	-0.30 (0.19)
Cost-to-income ratio	0.0070 (0.17)	-0.0028 (0.13)	0.0082 (0.15)	0.074 (0.25)	0.20 (0.26)	0.054 (0.28)
Loan growth	-0.76** (0.38)	-0.51* (0.27)	-0.74** (0.33)	-1.35** (0.53)	-0.99** (0.42)	-1.33** (0.52)
Loan concentration		-1.74** (0.72)			-1.03 (0.81)	
Market-to-book ratio			-0.096 (0.13)			-0.10 (0.14)
Stock-based compensation			-0.12 (0.21)			-0.25 (0.23)
lnDPS				0.013 (0.12)	0.029 (0.12)	0.0057 (0.12)
Time fixed-effect	YES	YES	YES	YES	YES	YES
Constant	13.5** (6.48)	17.5*** (5.37)	14.0** (6.88)	1.39 (5.71)	5.15 (4.52)	1.03 (6.30)
Observations	699	626	699	505	447	505
Number of banks	127	111	127	102	87	102
R-squared	0.31	0.34	0.31	0.44	0.48	0.44
Chi2	110	130	133	174	179	178
Prob>Chi2	0	0	0	0	0	0

This table represents the estimation of bank fixed-effect panel model for banks' equity-to-assets ratio in the following year, with an alternative predicted likelihood of targeting ROE ( $\widehat{p2}_{target}$ ) based on the second specification in Table 3. *Equity ratio* is in percentage. *Size* is the natural logarithm of total assets valued as millions of US dollars. *Non-performing loans* represents the proportion of non-performing loans to total loans. *Top 5 FIVE holding* is the total percentage holdings by the top five "FIVE" shareholders, where so-called "FIVE" is for controlling shareholders, who directly or indirectly hold more than five percent of a voting class of a company's stock. *One-year stock return* is the carry-trade return from the end of the previous year to that of current year. *Loan growth* is for the annual growth of net loans. *Loan concentration* is valued by the Herfindahl-Hirschman Index of loans categorised into commercial loans, mortgage loans, consumer loans, and other loans. *Cost-to-income ratio* measures management inefficiency and is defined as the ratio of total expense to total income. Additionally, we regard a negative cost-to-income ratio due to negative income as a missing value since it does not represent a high level of management efficiency. *Market-to-book ratio* is the ratio of market capitalization to the book value of common equity. *Stock-based compensation* is a dummy variable indicating the existence of any stock-based compensation for the managers or employees. *lnDPS* is valued as the natural logarithm of dividend per share in dollars. In parenthesis are bootstrapped standard errors. The superscripts \*, \*\*, and \*\*\* indicate statistic significance at 10%, 5%, and 1%, respectively.

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