Targeting return on equity:
Banks' controlling ownership and risk

Caren Yinxia Nielsen[a,b], Lars Ohnemus[a]

[a]*Center for Corporate Governance, Department of Accounting, Copenhagen Business School, Solbjerg Plads 3, 2000 Copenhagen, Denmark*
[b]*Knut Wicksell Centre for Financial Studies, Lund University, P.O. Box 7080, 22007 Lund, Sweden*

Abstract

Since the 2008–09 global financial crisis, banks have been criticized for excessive leveraging in their balance sheets to reach for return on equity (ROE) targets. We conduct the first systematic study of banks' actual practices of targeting ROE based on unique hand-collected data for 188 publicly listed European commercial banks from 2000 to 2018. The results show that the increasing holding of large controlling owners is positively and significantly linked to the propensity to target ROE. This finding is in line with the agency theory that these owners monitor the management to reduce the principle–agent conflicts, but we also find that stock-based compensation is positively linked to managers' tendency to publish explicit target numbers. However, contradicting the criticism on banks' excessive risk taking, a higher probability of ROE targeting leads to a marginally lower probability of default in the following year. Furthermore, this risk reduction is mainly driven by the significant increase in regulatory capital reserves rather than return on assets or equity ratio. Our study contributes to the understanding of not only targeting itself, but also the implicit linkage between bank ownership and risk taking. In addition, it offers insights for policymakers on bank regulation.

Keywords: Banks; targeting return on equity; agency theory; controlling ownership; default risk; regulatory capital

JEL classifications: G21; G28; G32; G34

Version: August 2020

1. Introduction

As the suppliers of capital, financiers are regarded as the "owners" of a corporation. Yet, the separation of finance and management, or ownership and control, in public corporations is an obstacle to shareholders' control of the payoffs on their investment (Jensen and Meckling, 1976; Fama and Jensen, 1983a,b; Shleifer and Vishny, 1997). On the other side, how the financiers assure themselves of getting a return on their investment is one of the key elements of corporate governance and is crucial for the flows of financing from external investors.

One choice for ensuring returns to the financiers is to set various performance goals for the managers, tying the managers' interests to the financiers'. The mostly widely applied mechanism is to incorporate managers' performance goals in their incentive packages, and this pay-for-performance has attracted vast research from optimal contracting for shareholders to managerial power influencing contracting (Murphy, 1999; Bebchuk and Fried, 2003; Murphy, 2012; Bennett et al., 2017; Edmans et al., 2017). However, there is little research in economics on setting overall firm-level performance goals as a management practice and its risk implications. This is especially relevant for banks: They play a pivotal role as liquidity provider in the economy, but they can have a highly destructive impact if they engage in excessive risk taking.

Particularly for the banking industry, return on equity (ROE, ratio of net income to total equity) is commonly used as an overall performance metric. Banks generally set targets for ROE rather than return on assets (ROA, ratio of net income to total assets) or even more regulatory-relevant metrics with risk adjustment, such as return on risk-weighted assets and return on economic capital. The latter metrics are only used for evaluation by a few banks.[1] Banks are criticized for targeting ROE for their potential earning management because they can leverage their balance sheets to mechanically boost ROE without increasing ROA[2] and outdo their competitors (Haldane, 2009; Pagratis et al., 2014).

At the same time, due to the ramification of the 2008–09 global financial crisis to the broad economy, ignited by the subprime mortgage crisis, a bright spotlight has highlighted banks' risk taking and their potential systemic risk. In response, regulatory frameworks, such as the Basel Accords,[3] have been instituted 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 noteworthy is Basel III's (2010) cap on banks' leverage and the requirements for higher quality capital buffers.

---

[1]Besides the overall returns, banks typically set performance goals, which are important for banking operations, such as loan growth ratio, cost-to-income ratio, earning per share, and capital ratio, also with the purpose of fulfilling regulatory requirements.

[2]Simple math shows that ROE is equal to ROA times leverage (ratio of total assets to total equity).

[3]The Basel Accords are international standards for bank regulation promulgated by the Basel Committee on Banking Supervision to enhance financial stability by improving the quality of banking supervision worldwide.

Yet, targeting ROE is still a common practice for banks since the crisis. Is targeting ROE linked to banks' excessive risk taking and overleveraging? Should limiting ROE targeting be included in regulatory frameworks, removing it from the sole control of the board of directors or management in the future? To answer these questions, we conduct the first systematic study of banks' actual ROE-targeting practice and its implications on banks' risk, based on unique hand-collected ROE-targeting data for 188 publicly listed European commercial banks from 2000 to 2018.

Our results indicate controlling shareholders' importance in determining banks' choices to set ROE targets. More specifically, cash-flow rights held by current controlling shareholders are significantly and positively linked to banks' propensity to target ROE. This is consistent with the literature on large shareholders exercising their voting rights to reduce principle–agent conflicts (Shleifer and Vishny, 1986, 1997; La Porta et al., 2002) and increasing their own cash-flow rights to reduce majority–minority principle conflicts (Jensen and Meckling, 1976; Burkart et al., 1997). A medium marginal effect (0.054 in Table 3, Section 5) suggests that a one-standard-deviation increase of holdings (3.78% shares) by these controlling shareholders leads to a nontrivial 20.4% increase in the likelihood of ROE targeting. We also link stock-based compensation and managers' tendency to explicitly publish target numbers rather than implicitly indicating the existence of a target. This implies that explicit publishing reveals a higher level of commitment, in line with the literature on enforcement of pay-for-performance contracting and managerial power over contracting (Bebchuk and Fried, 2003; Bennett et al., 2017; Edmans et al., 2017).

However, contradicting the criticism on banks' excessive risk taking to reach for ROE targets, our results indicate a marginal reduction of default risk linked to a higher propensity for ROE targeting. Corresponding to the aforementioned 20.4% increase of targeting propensity, a mild effect (-53.4 in Table 8, Section 5) of targeting propensity on default risk implies a reduction in probability of default in the following year by 10.9% (approximately a third of a standard deviation). Furthermore, this risk reduction is mainly due to the significantly increased total risk-based regulatory capital, especially Tier 1 capital,[4] and is mostly driven by big banks. Yet, there is no significant impact of targeting propensity on banks' leverage, as criticized.

Since ROE targets measure the expected return to the equity holders, the strategy of targeting ROE reveals the balance of power between shareholders and managers, previewed by the monitor effect of controlling shareholding and the incentive effect of stock-based compensation in our results. In addition, the results on the risk implication of reaching for a target contribute not only to the

---

[4]Regulatory capital consists of Tier 1 capital and Tier 2 capital. Under Basel III framework, Tier 1 capital provides loss absorption on a going-concern basis and is permanently available for this purpose; Tier 2 capital is gone-concern capital, which absorbs losses before depositors and general creditors do when a bank fails. See Basel Accords published by the Basel Committee on Banking Supervision for the definition of regulatory capital used in the different regulatory regimes. Source: `https://www.bis.org/bcbs/index.htm`.

understanding of targeting ROE, highly relevant for policymakers, but also the implicit linkage between bank ownership and risk taking.

The remainder of the paper is organized as follows. Section 2 reviews the literature. Section 3 describes the dataset, including the ROE-targeting data collection, and the variables used in our analysis. In Section 4, we discuss the methodology for the empirical tests. In Section 5, we conduct our empirical tests and analyze the results' implications. Section 6 concludes.

2. Literature review

Amid the criticism of banks' excessive risk taking linked to the 2008–09 global financial crisis, banks are criticized for targeting ROE and overleveraging their balance sheets to outdo their competitors. Haldane (2009) points out that the dominate drive of banks' ROE is leverage rather than ROA, which reflects management skill in extracting profits from the assets pool, especially during the golden era of banks' equity market from 1986 to 2006, in conjunction with high-pressure 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.

ROE targets measure shareholders' return expectation, and targeting ROE sends a signal that management promises to serve their interests. This naturally brings into play the separation of financiers and managers in publicly listed banks and their power balance over banks' residual control rights. This principle–agent problem is based on the view of a firm as a contract between the financiers and the manager (Coase, 1937; Jensen and Meckling, 1976; Fama and Jensen, 1983a,b), and managers have incentive to pursue their private benefits due to the holdings of the residual control rights (Jensen, 1986; Grossman and Hart, 1988; Shleifer and Vishny, 1997). This situation creates problems for financiers to assure their own return on their investment, and the well functioning capital market.

One common approach to reduce this type of agency costs is ownership by large investors, since large shareholders can exercise their large voting rights to control management (Shleifer and Vishny, 1986, 1997; La Porta et al., 2002). At the same time, expropriating resources from the corporation by the controlling shareholders (See Jensen and Meckling, 1976) is costly, and increases in their cash-flow rights will reduce this type of expropriation, holding other factors constant (Burkart et al., 1997). Nevertheless, only some institutional investors are deemed as active in monitoring and influencing corporate governance (See Chen et al., 2007; Ferreira and Matos, 2008; McCahery et al., 2016).

Besides large shareholders' monitoring, incentive alignment of the owner and agent interests through agent compensation and equity ownership is another primary mechanism for controlling

3

agency costs (Jensen and Meckling, 1976; Nyberg et al., 2010). Bennett et al. (2017) study the performance goals employed in executive-incentive contracts and find that CEOs of firms that miss their performance targets are more likely to experience forced turnover. On the other side, the managerial-power and rent-extraction view of contracting argues that managers have power to influence pay-for-performance contracting to extract private benefits (Bertrand and Mullainathan, 2001; Bebchuk et al., 2002; Bebchuk and Fried, 2003; Edmans et al., 2017).

In addition to various discussions on the costs and benefits of monitoring and incentive mechanisms, there is also no consensus on their relationship. Hartzell and Starks (2003) find that institutional ownership concentration is positivly related to pay-for-performance sensitivity of executive compensation, while Martin et al. (2019) show that CEO earnings management aimed at perserving their equity wealth is accentuated by more concentrated institutional ownership.

Since targeting ROE is a common management practice within the banking industry, and it signals commitment of the manager to deliver a certain return to the shareholders, the drives of ROE targeting could reveal different aspects of aforementioned mechanisms for reducing agency costs. In addition, since banks have choice of whether to publish the explicit target number, which is known to the insiders, the extent of publishing reveals the degree of commitment due to the manager's informational advantages.

Meanwhile, due to the pivotal position of banks in the economy and the criticism and tightened regulation on banks since the global financial crisis, the risk implication of this commitment is in focus and essential. Firms with limited liability offer stockholders incentive to increase the firm's risk since this can increase the value of their equity *call* options by increasing the risk of the underlying assets (Galai and Masulis, 1976; Esty, 1998). While the safe-net system for banks, typically deposit insurance, results in a positive premium similar as a *put* option for shareholders, which also increases with bank risk (Merton, 1977; Keeley, 1990). Motivated by these theories, Saunders et al. (1990) find evidence that a higher proportion of stock owned by managers increases bank risk, consistent with the hypothesis that stockholder-controlled banks have incentives to take higher risk than manager-controlled banks. Laeven and Levine (2009) document that bank risk is generally higher in banks with large owners controlling substantial cash-flow rights.

Different from the literature, our paper studies the different mechanisms for reducing agency costs in the context of listed commercial banks' ROE targeting and their implications for banks' risk. Particularly different from Haldane (2009) and Pagratis et al. (2014), we study banks' actual practice of targeting ROE and especially its effect on banks' default risk, with consideration of bank regulation. Therefore, our study contributes not only to the public debates on banks' risk taking and related policy implications, but also to the literature on banks' corporate governance, impact of owners involvement and its linkage to bank risk.

3. Data

We hand collect a unique dataset on the banks' ROE-targeting practice–i.e. whether a year-end target exists and its level, if available–from the publicly available filing reports of all publicly listed European commercial banks from 2000 to 2018. Notice that the target here is for the overall bank-level business, not for executive-incentive contracts, although we do collect information on whether another, typically much lower, ROE target is used in the executive contracting. Subsequently, we match this ROE-targeting dataset with banks' fundamentals and various measures of risk based on the data from Standard & Poor's Capital IQ database. Furthermore, we thoroughly check each bank's ties to government, corporate structure, and related transactions, especially mergers and acquisitions, to exclude banks that are owned or explicitly guaranteed by government or subsidiaries within the same corporate conglomerate because we use consolidated financial reports. We also convert the valuations from the local reporting currencies into US dollars. This results in an unbalanced panel sample of 188 banks in 29 countries as shown in Table A1 of Appendix A.[5]

Naturally, some banks set performance targets for the evaluation parameters that are essential for their operations–such as growth ratio, cost-to-income ratio, earning per share, and capital ratio–due to management and regulatory concerns. As for the overall returns, some banks do apply return on assets, return on risk-weighted assets, return on risk adjusted capital, or risk-adjusted return on capital in their performance calculation. However, it is very rare[6] that these evaluations become the performance targets. Many banks not only use ROE as an evaluation metric, but also set targets for ROE.

Since we can only observe the existence of a target (indicated by *Targeting dummy*) when it is published, we use statistical models to infer the latent true targeting, which represents different business models and strategies.[7] As for the target levels, some banks disclose them explicitly, while others unfold their targets differently, such as "competitive with top peers." Since the exact target level is known to insiders, whether a bank explicitly publishes it (indicated by *Publishing number dummy*) represents its publishing attitude and its level of commitment.

Additionally, banks disclose explicit target numbers for the coming year or in a medium or long term. To ensure the highest consistency as much as possible, we only collect the target number

---

[5]Naturally, actual numbers of banks and countries in different specifications of regressions will shrink due to data availability and the existence of different fixed effects.

[6]Our sample includes only 0.3% of the bank–year observations that include targets for other types of overall returns rather than or together with that for ROE.

[7]The observed indicator of targeting ROE might reflect banks' publishing attitudes, which we try to set aside by modeling the latent true targeting. Nevertheless, if the prior belief is that targeting ROE is used to align the interests of managers with those of shareholders, naturally this information of targeting should be communicated to the public, especially to the current and potential equity holders. On the other side, whether a bank publishes the explicit target number shows more about that bank's publishing attitude.

for the nearest future and for a consistent term used by the bank, at the lower end if it is in a range. Although we collect the most consistent target for each individual bank, heterogeneity exists regarding target valuation. Some banks use before-tax figures while others use after-tax figures, and some banks only have targets for their core business. Therefore, we limit the discussion on the target levels to describing them in this section, as the explicit levels do convey certain information and contribute to our understanding of how the targets are set.

Furthermore, we also collect an indication of whether banks use ROE as a performance metric in their incentive programs for the top managers (*Incentive program dummy*), regardless of the payment forms of variable compensation, such as cash or stock. This information links our study to the literature on performance goals employed in executive-incentive contracts as in Bennett et al. (2017). However, a typical compensation criteria for ROE is much lower than the target for overall bank business, which weakens the linkage between the incentive program and overall ROE targeting.

Figure 1: Number of banks with different ROE-targeting strategies and published target numbers
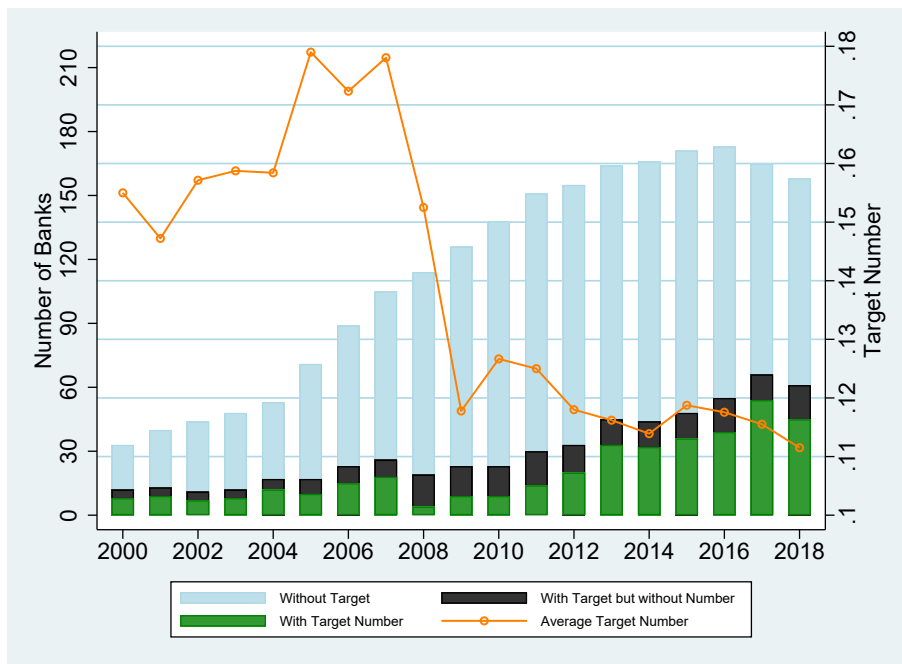
This figure shows the total number of banks without ROE target, banks with an unpublished target, and banks publishing explicit target numbers at the end of each year in our sample. It also displays the yearly average target for banks explicitly disclosing target levels.

In total, we have 2,164 bank–year ROE-target observations. Almost half of the banks in 29 countries set some target during the sample period. Similar as in Nielsen and Ohnemus (2018),[8] Figure 1 shows the total number of banks with different targeting and disclosing strategies and the

---

[8]This article is an early study of the project in Danish focusing on Danish banks.

6

average explicit target levels through the years. One obvious trend is that the number of banks with target (sum of the green bar at the bottom and the black bar in the middle) and that of banks with available target number (the green bar) are procyclical. This trend is more distinct for the yearly average target level, with a dramatic shift since the 2008–09 global financial crisis. Banks are more prone to target ROE and set the target higher when the market conditions become better.[9]

Table 1 summarizes the variables describing targeting, earnings, and our main measures of risk for the two groups, banks with and without targets.[10] To describe targeting, we have aforementioned *Targeting dummy*, *Publishing number dummy*, *ROE target number* (explicit target number published), and *Incentive program dummy*. In total, 26.7% of the bank–year observations indicate ROE targeting, of which 66% have explicit target levels published and 31% have ROE as a performance metric within their top managers' incentive programs. The published target level ranges from 3.5% to 26%, with an average of 13%. This pictures that the majority of the targets are explicitly published and there is a great variation of the target level between banks in addition to the time-series change showed in Figure 1.

The main measures of banks' earnings are *Return on assets* and *Return on equity* in this context due to the limitation of using other overall return metrics in practice. Since banks are criticized for overleverage in pursuit of the ROE target, leverage and default risk are essential to the risk implications of ROE targeting, especially from regulators' perspective. Therefore, we include *Default risk*, book leverage (inverse of *Equity-to-assets ratio*), regulatory capital adequacy (*Risk-based capital ratio* and *Tier 1 risk-based capital ratio*), and asset risk in relation to regulation (*Asset risk*). *Default risk* is measured as the probability of default within one year, 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) computation procedure with iterative estimation to estimate the market value and volatility of a bank's assets using the market value of its equity.[11]

Simple *t* tests show that, compared to banks without targets, on average, banks with targets are larger in size, do earn slightly higher return on assets, and even higher return on equity due to a

---

[9]Similar to the data information in Nielsen and Ohnemus (2018), Figure A1 in Appendix A shows more about the comparison between targets and realized ROE.

[10]Notice that since banks do change their ROE-targeting policy, one bank is very likely to appear in different groups through the years. For the variables that do not vary considerably within a bank, such as *Total assets*, statistics for the subgroups might be misleading. Nevertheless, they do convey certain information on targeting ROE and supplement our analysis in Section 5.

[11]Here we neglect the *put*-option value of various implicit and explicit government guarantees and safety nets for banks, such as deposit insurance, due to data limitation and estimation difficulty. Although concerns remain about the application of Merton's (1974) model for banks, Jessen and Lando (2015) show that a measure of default risk based on that model has proven empirically to be a strong predictor of default despite the simplifying underlying assumptions, and this result may stem from its strong robustness to model misspecifications.

Table 1: Summary Statistics (188 Banks in 29 Countries) for Banks with/without Targets

	Banks with targets (89 banks in 24 countries)					Banks without targets (164 banks in 28 countries)					t-test
	Observations	Mean	Std. dev.	Min.	Max.	Observations	Mean	Std. dev.	Min.	Max.	
Targeting dummy	578	1	0	1	1	1,586	0	0	0	0	
Publishing number dummy	578	0.66	0.47	0	1						
ROE target number	382	0.13	0.041	0.035	0.26						
Incentive package	578	0.31	0.46	0	1						
Total assets ($millions)	578	302,041	569,699	211	3.11e+06	1,586	129,104	357,484	3.09	3.67e+06	172937.4***
Return on assets	575	0.0071	0.0080	-0.090	0.044	1,567	0.0052	0.016	-0.12	0.13	0.0020***
Equity-to-assets ratio	575	0.073	0.036	0.0099	0.45	1,550	0.092	0.049	0.0015	0.72	-0.019***
Return on equity	574	0.098	0.075	-0.42	0.37	1,552	0.055	0.15	-0.99	0.81	0.042***
Default risk	501	0.28	0.39	0	1	1,177	0.19	0.32	0	1	0.097***
Asset risk	417	0.45	0.17	0.16	0.95	678	0.58	0.19	0.086	1.20	-0.12***
Risk-based capital ratio	451	0.16	0.043	0.088	0.32	907	0.15	0.047	0.0090	0.82	0.010***
Tier 1 risk-based capital ratio	443	0.13	0.047	0.057	0.34	814	0.13	0.052	0.0060	0.82	0.0067**
BIG	578	0.30	0.46	0	1	1,586	0.12	0.32	0	1	0.18***
SIB	223	0.38	0.49	0	1	424	0.25	0.43	0	1	0.14***

This table displays summary statistics on the variables describing targeting, earnings, and our main measures of risk for the two groups, banks with and without targets, and simple *t* tests on the difference between the two groups. The variables describing targeting are *Targeting dummy* (valued as one for a bank year when ROE targeting is observed), *Publishing number dummy* (valued as one when a bank explicitly publishes the target level), *ROE target number* (the explicit target number published), and *Incentive package* (a dummy for using ROE as one of the performance metrics for the top managers' variable compensation). The variables for earnings are *Return on assets* (ratio of net income to total assets) and *Return on equity* (ratio of net income to total equity). The main risk measures include *Equity-to-assets ratio* (ratio of total equity to total assets), *Default risk* (probability of default within one year, calculated based on Merton's (1974) model and by applying Vassalou and Xing's (2004) computation procedure with iterative estimation), *Asset risk* (valued as the ratio of total risk-adjusted assets to total assets), *Risk-based capital ratio* (ratio of regulatory capital to risk-adjusted assets), and *Tier 1 risk-based capital ratio* (ratio of Tier 1 regulatory capital to risk-adjusted assets). *Total assets* is in millions of US dollars.

mechanical effect of higher book leverage (lower *Equity-to-assets ratio*). However, banks with targets, on average, have higher *Default risk*, but relatively lower regulatory risk, such as lower *Asset risk* and higher capital adequacy (*Risk-based capital ratio* and *Tier 1 risk-based capital ratio*). Additionally, more big banks, by actual size (*BIG*) and by systemic risk (*SIB*), target ROE. The raw statistics picture some correlation of targeting ROE with certain risks, such as high book leverage and *Default risk*, but strong heterogeneity exists between banks due to their different operating markets, business models, and management. To count for the heterogeneity and other characteristics and disentangle the impact of ROE targeting, we apply more advanced methodologies in Section 4.

Table 2 summarizes all the variables used in our analysis for the whole sample. Their detailed definitions are displayed in Table A2 in Appendix A. We choose a wide range of variables, commonly used in the literature and by regulatory bodies, to proxy banks' soundness, from asset valuation and earnings, to capital structure and ownership.

Besides *Size* (natural logarithm of *Total assets*) and the aforementioned various measures of earnings and risk, we have four blocks of variables for bank characteristics. The first block consists of variables for ownership, which are shareholdings by different owner types, such as FIVE owners (where FIVE means the controlling shareholders who directly or indirectly hold at least five percent of a voting class of a company's stock), all owners, institutional owners, and insiders. Different from other owner types, FIVE owners are defined by their voting rights. We have natural logarithm of shareholdings by the current[12] top five owners (i.e. *Current top FIVE holding*, *Current top all holding*, *Current top institutional holding*, and *Current top insider holding*), and that of the holdings by the top five owners at the end of each year (i.e. *Top FIVE holding*, *Top all holding*, *Top institutional holding*, and *Top insider holding*), where the latter series of variables measures ownership concentration by different owner types.

The second block is for management efficiency and asset valuation. The proportion of nonperforming loans (*Nonperforming loans*) and loans' annual growth rate (*Loan growth*) assess riskiness of banks' lending business, whereas *Loan-to-deposit ratio* measures liquidity in the deposit aspect. For the overall on-book banking business, *Cost-to-income ratio*[13] measures management inefficiency in generating profits and *Noninterest-to-interest income* values the proportion of investment-driven business and represents market sensitivity of the assets.

The third block includes variables related to stocks and compensation. We have the natural

---

[12]"Current" here refers to September 2019 when we collected data for this version. The results are not influenced by which time we collect data and conduct the analysis, since the results are the same in the previous versions in 2016 and early 2019.

[13]*Cost-to-income ratio* is defined as the natural logarithm of the ratio of total expense to total income. Additionally, we regard a negative expense-to-income ratio due to negative income as a missing value, since it does not represent high management efficiency.

Table 2: Summary Statistics of the Data (188 Banks in 29 Countries)

	Observations	Mean	Std. dev.	Min.	Max.
Targeting dummy	2,164	0.27	0.44	0	1
Publishing number dummy	578	0.66	0.47	0	1
ROE target number	382	0.13	0.041	0.035	0.26
Incentive package	2,164	0.084	0.28	0	1
Return on assets	2,142	0.0057	0.014	-0.12	0.13
Equity-to-assets ratio	2,125	0.087	0.047	0.0015	0.72
Return on equity	2,126	0.067	0.14	-0.99	0.81
Default risk	1,678	0.22	0.35	0	1
Asset risk	1,095	0.53	0.19	0.086	1.20
Risk-based capital ratio	1,358	0.15	0.046	0.0090	0.82
Tier 1 risk-based capital ratio	1,257	0.13	0.051	0.0060	0.82
Total assets	2,164	175,295	431,371	3.09	3.67e+06
Size	2,164	9.66	2.49	1.13	15.1
Current top FIVE holding	1,130	3.06	1.33	-3.40	4.60
Current top all holding	1,555	2.55	1.96	-6.94	4.60
Current top institutional holding	1,574	1.41	1.94	-9.43	4.60
Current top insider holding	977	-1.49	3.31	-11.5	4.45
Top FIVE holding	1,395	3.40	0.94	-1.71	4.60
Top all holding	1,542	3.40	1.00	-1.71	4.60
Top institutional holding	1,540	3.28	1.14	-4.96	4.60
Top insider holding	1,113	-0.82	3.00	-9.90	4.54
Cost-to-income ratio	2,108	-0.29	0.22	-1.38	3.63
Noninterest-to-interest income	2,111	-1.22	1.00	-7.93	2.82
Loan-to-deposit ratio	2,137	4.66	0.50	2.47	9.83
Nonperforming loans	1,363	0.070	0.099	0.00039	0.65
Loan growth	2,125	0.29	7.77	-0.85	357
Market-to-book ratio	1,920	-0.27	0.94	-7.49	3.19
Stock return	1,878	-0.042	0.64	-5.90	7.60
Stock-based compensation dummy	2,002	0.26	0.44	0	1
Stock-based compensation	1,981	0.69	1.56	0	7.48
Stock-based compensation/stock price	1,927	0.32	0.98	0	7.48
CEO compensation	1,518	11.9	3.38	-0.72	17.6
BIG	2,164	0.16	0.37	0	1
SIB	647	0.29	0.46	0	1
$\widehat{p1}_{\text{targeting}}$	1,107	0.18	0.23	3.1e-06	0.95
$\widehat{p2}_{\text{targeting}}$	1,107	0.18	0.23	0.000032	0.94

This table displays summary statistics for the whole sample. The variables characterizing targeting are *Targeting dummy* (valued as one for a bank year when the bank sets a ROE target), *Publishing number dummy* (valued as one when a bank explicitly publishes the target number), *ROE target number* (the explicit target number published), and *Incentive package* (a dummy for the existence of using ROE as one of the performance metrics for the top managers' variable compensation for the whole population). The variables measuring earnings are *Return on assets* and *Return on equity*. Our main risk measures include *Default risk* (the probability of default within one year, calculated based on Merton's (1974) model by applying Vassalou and Xing's (2004) computation procedure with iterative estimation), *Equity-to-assets ratio*, *Asset risk* (ratio of total risk-adjusted assets to total assets), *Risk-based capital ratio* (ratio of regulatory capital to risk-adjusted assets), and *Tier 1 risk-based capital ratio* (ratio of Tier 1 regulatory capital to risk-adjusted assets). The different ownership variables include natural logarithm of total percentage of holdings by the current top five FIVE owners (where FIVE means the controlling shareholders holding at least five percent of voting rights), all owners, institutional owners, and insiders, i.e. *Current top FIVE holding*, *Current top all holding*, *Current top institutional holding*, and *Current top insider holding*, and by historical top five FIVE owners, all owners, institutional owners, and insiders, i.e. *Top FIVE holding*, *Top all holding*, *Top institutional holding*, and *Top insider holding*. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Noninterest-to-interest income* (natural logarithm of the ratio of absolute value of noninterest income to that of interest income), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Loan-to-deposit ratio* (natural logarithm of the ratio of total net loans to deposits), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), *Stock return* (one-year carry-trade stock return), *Stock-based compensation dummy* (a dummy variable indicating the existence of any stock-based compensation for the managers or employees), *Stock-based compensation* (natural logarithm of the actual stock-based compensation in millions of US dollars), *Stock-based compensation/stock price* (natural logarithm of the actual stock-based compensation relative to stock price), *CEO compensation* (natural logarithm of total CEO compensation), *SIB* (a dummy for being reported by national regulators as Systemically Important Banks to the European Banking Authority since 2015), and *BIG* (a dummy for banks with total assets above EUR 200 billion at end of each year). In addition, $\widehat{p1}_{\text{targeting}}$ is our model-implied bank-level probability of targeting ROE, used in our main analysis, whereas $\widehat{p2}_{\text{targeting}}$ is for the robustness check.

logarithm of the market valuation of a bank's equity relative to its book value (*Market-to-book ratio*) and the yearly carry-trade return of its stock (*Stock return*). Regarding compensation, we have different measures of stock-based compensation for the managers or employees, i.e. the existence of a compensation scheme (*Stock-based compensation dummy*), the natural logarithm of the absolute amount (*Stock-based compensation*), and the natural logarithm of the relative amount in relation to stock price (*Stock-based compensation/stock price*). Additionally, we include the natural logarithm of the total CEO compensation (*CEO compensation*).

The fourth block consists of bank–year indicators of being big due to the concerns of systemic risk and too big to fail. They are a dummy for being reported as Systemically Important Banks (SIB) by national regulators in the European Economic Area (EEA) to the European Banking Authority (EBA) since 2015 (*SIB*) and a dummy for banks with total assets above EUR 200 billion at end of each year (*BIG*).[14]

At the bottom of the table, we have our predicted probabilities of ROE targeting. $\widehat{p1_{\text{targeting}}}$ is our model-implied bank-level probability, used in the main analysis, whereas $\widehat{p2_{\text{targeting}}}$ is used for the robustness check. The predicted probabilities are close to the true observation and range between 0 and 1. Other bank-level characteristics display plausible and relatively unnoteworthy distributions.

4. Methodology

From the perspective of central banks and bank regulatory authorities, it is pivotal to understand the economic consequences of banks' ROE targeting and whether there is a tendency toward excessive leverage as Haldane (2009) noticed. Yet, to investigate the economic implications of ROE targeting, we must first understand its drivers, embedded in the information on which banks set targets and publish explicit targets.

Since we can only observe a bank setting a target when the bank publishes this targeting information, we must use statistical models to infer latent actual targeting, which is connected to the management and business strategies. Furthermore, it is not the action of targeting *per se* that leads to possible changes of the bank's risk profile in the following year. Rather, the drives of management influence the targeting decision and thereafter possible shift of business strategies following ROE targeting. Therefore, we cannot just regress the *Targeting dummy* directly on banks' risk in the following year and must follow a two-stage procedure. In the first stage, we use banks' characteristics in year *t* to explain their decisions on whether to set a ROE target at the end of the

---

[14]We use EUR 200 billion as the cutoff because the EBA identifies Globally Systemically Important Banks (GSIB) by a leverage-ratio exposure of more than EUR 200 billion. *BIG* is an indicator available at the end of each year for all banks, whereas the SIB indicator identified by the EBA is only available from 2015 onward.

year.[15] In the second stage, we use the predicted probability of targeting from the first stage to explain banks' risk in year $t+1$. Meanwhile, we can incorporate bank-level individual effects in the estimation of targeting propensity, which is impossible with a universal dummy.

Besides the decision on targeting, *Publishing number dummy* indicates banks' tendency to publish the explicit target level. Since insiders know the exact target level, *Publishing number dummy* reveals the banks' publishing attitude and can be deemed as a stronger commitment to serving shareholders' interests.

To illustrate the process, we have the following two stages.

Stage 1, we study which bank characteristics explain banks' decisions on ROE targeting and on whether to publish the explicit target number.

First, we apply panel probit random-effect models to study the targeting decision, as outlined in Equation (1). Since "targeting or not" is a bank's active choice, we cannot assume that the unobserved effect is random and unrelated to the bank's characteristics. Therefore, we use Chamberlain's correlated random effects probit model (Wooldridge, 2010) and assume the unobserved heterogeneous effect is a linear function of the individual time means of the explanatory variables in the whole sample.

$$
\begin{aligned}
Pr(G_{i,t}=1) &= Pr(G_{i,t}^{*}>0) = \Phi\{\mathbf{X_{G,i,t}}\beta_{\mathbf{G}}+c_{i1}+u_{i,t1}\}, \\
\text{and } c_{i1} &= \eta_1 + \overline{\mathbf{X_{G,i}}}\xi_{\mathbf{1}}+a_{i1}
\end{aligned}
\tag{1}
$$

where $G_{i,t}$ is an indicator taking one if bank i has a ROE target goal observed at time t and zero otherwise, $G_{i,t}^{*}$ is the latent targeting variable, Φ is the standard normal cumulative-distribution function, $\mathbf{X_{G,i,t}}$ is a set of bank-level fundamentals determining the likelihood of setting a target, c_{i1} is the unobserved effect, $u_{i,t1}$ is the idiosyncratic error, $\overline{\mathbf{X_{G,i}}}$ is the set of individual time means of the explanatory variables, a_{i1} models bank-level random effects (i.i.d. with distribution $N(0,\sigma_{a1}{}^2)$), and $\beta_{\mathbf{G}}$ and $\xi_{\mathbf{1}}$ are coefficient vectors.

Second, we use a similar model to explain the descision to publish the target number or not. However, only after a bank sets a target does the choice to explicitly publish the target number arise. Thus, we have a potential selection bias that banks with observed zero targeting could have true nonzero targeting and a positive propensity to explicitly publish the target number. To correct this possible selection bias, we follow Semykina and Wooldridge (2018) and model unobserved individual effects as a linear function of the individual time means of the explanatory variables in

---

[15] Notice that banks' characteristics are year-end observations, while public filings containing targeting information are typically available a few months later.

the selection equation (1). Equation (2) displays the model for publishing the target number.

$$Pr(M_{i,t} = 1|G_{i,t} = 1) = \Phi\{\mathbf{X_{M,i,t}}\beta_{\mathbf{M}} + c_{i2} + u_{i,t2}\},$$
$$\text{and } c_{i2} = \eta_2 + \overline{\mathbf{X_{G,i}}}\xi_{\mathbf{2}} + a_{i2} \tag{2}$$

where $M_{i,t}$ takes one if bank i explicitly publishes the target number at time t and zero otherwise, $\mathbf{X_{M,i,t}}$ is a set of bank-level determinants for the likelihood of publishing the target number, c_{i2} is the unobserved effect, $u_{i,t2}$ is the idiosyncratic error, $\overline{\mathbf{X_{G,i}}}$ is the same as in Equation (1), a_{i2} is for bank-level random effects (i.i.d. with distribution $N(0, \sigma_{a2}{}^2)$), and $\beta_{\mathbf{M}}$ and $\xi_{\mathbf{2}}$ are vectors of coefficients. Notice that the vector of covariates in the selection equation, $\mathbf{X_{G,i,t}}$, includes at least one more variable than $\mathbf{X_{M,i,t}}$.

For the practical estimation of Equation (2), we chose equations with suitable exclusion restrictions (the variables included in $\mathbf{X_{G,i,t}}$ but excluded in $\mathbf{X_{M,i,t}}$) for the selection equation (1), so that the error terms in Equations (1) and (2) are not significantly correlated in the baseline pooled probit models with simultaneous estimation applying Heckman's (1979) approach.[16] We then estimate them separately with panel probit models to properly account for bank-level heterogeneity.

Stage 2, we apply the estimated ROE-targeting probability from Equation (1) to investigate its impact on banks' risk in the following year. Here, we use linear panel fixed-effect models.

$$R_{i,t+1} = \alpha + \beta_p \widehat{Pr(G_{i,t} = 1)} + \mathbf{X_{G,i,t}}\beta_{\mathbf{G}} + \mathbf{X_{R,i,t}}\beta_{\mathbf{R}} + \psi_t + \gamma_i + u_{i,t}, \tag{3}$$

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 ROE-targeting probability 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 ROE-targeting decision, ψ_t is for time fixed effects to control for common period shocks, γ_i is for bank-level fixed effects, and $u_{i,t}$ is the idiosyncratic error. We include $\mathbf{X_{G,i,t}}$ as a part of the explanatory variables to ensure that β_p captures only the ROE-targeting effect on banks' risk rather than that of $\mathbf{X_{G,i,t}}$.

---

[16]Correlated error terms in the main and selection equations would mean that selection is related to unobservables affecting the main equation. An approach to avoid biased results is to simultaneously estimate both equations with pooled probit models. However, simultaneous estimation becomes problematic for our small and unbalanced sample with so many explanatory variables.

5. Results

5.1. Targeting ROE

Since ROE is an earnings measure for equity holders, setting a ROE goal means not only targeting higher earnings, but also a possible change of business strategies toward serving equity holders. To understand the underlying mechanism associated with ROE targeting, we first investigate which bank characteristics explain the choice of setting ROE targets and infer the latent targeting propensity. As outlined in Section 4, we apply a correlated panel random-effect model, where the bank heterogeneity is correlated with bank characteristics.

Table 3 reports the results for this targeting propensity, with different specifications of the model (1) as defined in Section 4. For each specification, it reports both the coefficients of the explanatory variables and their average marginal effects on the targeting probability at the mean.

One significant determinant of this propensity is current controlling owners' shareholding (*Current top FIVE holding*). This variable values the cash-flow rights of the current top five controlling stockholders who own at least five percent of the voting rights. Its significant positive effect on the ROE-targeting propensity is consistent with the literature (Shleifer and Vishny, 1997; La Porta et al., 2002): Large controlling shareholders exercise their voting rights to control the management and therefore reduce shareholders–manager agency conflicts. These current controlling shareholders could come to hold 5% or more of the voting rights in the middle or later period. Their increasing holdings represent not only their stronger interests in the bank, but also potentially active influence over management to align managers' interests with theirs. At the same time, not only the control rights, but also the cash-flow rights of the controlling owners matter. This is consistent with the literature: 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 *Current top FIVE holding* on targeting probability ranges from 0.036 to 0.096 with different specifications and thereby different samples. A marginal effect of 0.054 suggests that a one-standard-deviation increase (3.78% of shares) increases the ROE-targeting likelihood by 20.4% (close to a half of a standard deviation of *Targeting dummy*), a nontrivial increase.

Additionally, increasing bank size and decreasing the *Cost-to-income ratio* have certain effects, which captures growing banks' effort on shareholders' behalf and their confidence for generating high earnings with greater management efficiency. Other performance and valuations regarding assets, deposits, and equity do not significantly explain this signalization of this commitment.

Due to country heterogeneity regarding institutional settings, capital markets, and legal environments, we only discuss the results including country fixed effects from now on.[17] Table 4 demonstrates the

---

[17]Because *Noninterest-to-interest income* represents the proportion of investment-driven business, and therefore

Table 3: ROE-Targeting Propensity

	(1) Coef.	(1) ME	(2) Coef.	(2) ME	(3) Coef.	(3) ME	(4) Coef.	(4) ME	(5) Coef.	(5) ME	(6) Coef.	(6) ME	(7) Coef.	(7) ME
Size			0.70*	0.12	0.75*	0.13	0.78*	0.12	0.90**	0.18*	0.40	0.077	0.57	0.12
			(0.40)	(0.083)	(0.41)	(0.085)	(0.43)	(0.084)	(0.44)	(0.11)	(0.47)	(0.094)	(0.52)	(0.11)
Current top FIVE holding	0.29***	0.039*	0.22**	0.038	0.21**	0.036	0.24**	0.039	0.27**	0.054**	0.40***	0.077**	0.47***	0.096**
	(0.11)	(0.023)	(0.11)	(0.024)	(0.11)	(0.023)	(0.11)	(0.024)	(0.11)	(0.027)	(0.13)	(0.037)	(0.14)	(0.043)
Cost-to-income ratio			-1.32**	-0.22	-0.59	-0.099			-0.75	-0.15	0.18	0.034	0.63	0.13
			(0.62)	(0.14)	(0.66)	(0.12)			(0.73)	(0.15)	(0.72)	(0.14)	(0.74)	(0.16)
Return on assets							11.1	1.79						
							(13.8)	(2.33)						
Loan-to-deposit ratio							-0.46	-0.074						
							(0.53)	(0.087)						
Noninterest-to-interest income					0.37	0.063					0.52	0.100	0.52	0.11
					(0.27)	(0.049)					(0.34)	(0.073)	(0.39)	(0.086)
Loan growth											0.10	0.019	0.023	0.0048
											(0.41)	(0.080)	(0.40)	(0.083)
Nonperforming loans											-0.00100	-0.00019	1.22	0.25
											(4.35)	(0.83)	(4.01)	(0.83)
Market-to-book ratio									0.35	0.069			0.39	0.080
									(0.29)	(0.061)			(0.29)	(0.069)
Stock return									0.034	0.0068			0.0019	0.00038
									(0.22)	(0.044)			(0.28)	(0.057)
Time means of the population	YES		YES		YES		YES		YES		YES		YES	
Observations	1,130		1,107		1,107		1,107		1,084		761		744	
Number of banks	144		141		141		141		140		108		106	
Pseudo R^2	0.026		0.040		0.046		0.046		0.057		0.12		0.12	
Chi^2	27		35.5		33.6		33.6		43		34.9		37.4	
Prob>chi^2	1.4e-06		3.4e-06		0.000048		0.000048		5.1e-06		0.00049		0.0019	

This table reports coefficients (*Coef.*) and marginal effects (*ME*) from the estimation on banks' ROE-targeting propensity, with different specifications for Equation (1). The explanatory variables include *Size* (the natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Return on assets*, *Loan-to-deposit ratio* (natural logarithm of the ratio of total net loans to deposits), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Loan growth* (annual growth rate of total net loans), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). *Time means of the population* represents all the individual time means of the explanatory variables, as explained in Section 4. In parentheses are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 4: ROE-Targeting Propensity–Period Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Size		1.14**	1.26**	0.83	0.92		1.33**	1.47**	0.98	1.11*
		(0.50)	(0.55)	(0.54)	(0.62)		(0.58)	(0.59)	(0.62)	(0.65)
Current top FIVE holding	0.26**	0.18	0.18*	0.34**	0.35***	0.21	0.23	0.23*	0.45***	0.45***
	(0.11)	(0.12)	(0.10)	(0.14)	(0.12)	(0.15)	(0.15)	(0.14)	(0.15)	(0.16)
Cost-to-income ratio		-0.055	0.25	1.16*	1.28**		0.27	0.60	1.13*	1.32*
		(0.54)	(0.61)	(0.61)	(0.64)		(0.55)	(0.56)	(0.68)	(0.70)
Country-specific crisis	-0.72***	-0.96***	-0.97***	-0.73***	-0.72**					
	(0.23)	(0.26)	(0.28)	(0.27)	(0.29)					
Noninterest-to-interest income				0.36	0.38				0.39	0.40
				(0.40)	(0.43)				(0.41)	(0.42)
Loan growth				0.022	0.0079				-0.087	-0.045
				(0.39)	(0.38)				(0.42)	(0.40)
Nonperforming loans				2.97	3.19				8.23	8.60
				(4.85)	(4.48)				(5.42)	(5.55)
Market-to-book ratio			0.055		0.11			0.21		0.095
			(0.37)		(0.36)			(0.39)		(0.42)
Stock return			0.032		-0.0068			-0.057		0.22
			(0.27)		(0.29)			(0.37)		(0.42)
Time means of the population	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
Observations	880	860	843	571	560	880	860	843	571	560
Number of banks	116	113	110	82	79	116	113	110	82	79
Pseudo R^2	0.13	0.18	0.19	0.21	0.23	0.15	0.20	0.21	0.22	0.25
Chi^2	47.7	64.9	77.5	96.9	227	75.6	96.9	143	183	405
Prob>chi^2	0.000052	1.2e-06	8.1e-08	4.2e-10	0	5.1e-06	3.3e-08	0	0	0

This table reports the period effect on the ROE-targeting propensity. The explanatory variables include *Country-specific crisis* (a dummy for the country-specific systemic crises defined by the European Central Bank), *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Loan growth* (annual growth rate of total net loans), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). *Time means of the population* represents all the individual time means of the explanatory variables, as explained in Section 4. In parentheses are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

period effect on ROE targeting. *Country-specific crisis* is a dummy for the country-specific systemic crises defined by the European Central Bank.[18] Intuitively, banks are less likely to set performance targets during economic downturns. The result is the same when we replace this crisis dummy with a universal crisis period (*Universal crisis*) covering the economic recessions in Europe (from 2008 to 2009 and 2011 to 2013).[19]

The impact of *Current top FIVE holding* remains significant after we add the year fixed effect to control the common period-specific shocks. Yet, after we control for the portion of investment-driven business and risk of loans, which trims a third of the observations, *Cost-to-income ratio* is marginally positively associated with the ROE-targeting likelihood. This implies that among these banks, managers need to make more effort to signal their commitment despite their poor performance.

As shown in Table 5, the holdings of current top all shareholders, institutional shareholders, or insiders (i.e. *Current top all holding*, *Current top institutional holding*, or *Current top insider holding*) have no significant explaining power, nor do those of the top owners at the end of each year within different categories (i.e. *Top FIVE holding*, *Top all holding*, *Top institutional holding*, or *Top insider holding*), where the latter series measures ownership concentration. This offers further evidence that *Current top FIVE holding* captures controlling shareholders' implicit monitoring effect on the management.

All in all, bank characteristics' explanations of the choice to target ROE reveal controlling shareholders' monitoring effect and hint at the prospect of earnings, such as economic crisis and management efficiency, to generate profits.

5.2. Publishing target number

Although the majority of the targets (66%, see Section 3) are published as explicit levels, some banks during some periods choose to restrict the numbers to insiders. What determine banks' choices to explicitly publish target levels?

Since only a subsample of the banks with targets publish target numbers, we follow Semykina and Wooldridge (2018) and model the correlated panel probit model taking consideration of possible sample selection bias, as explained in Section 4. Table 6[20] reports the results when we use

---

is negatively correlated with *Loan-to-deposit ratio*, and *Cost-to-income ratio* measures management inefficiency in generating earnings, and therefore is negatively correlated with *Return on assets*, we focus on other controls in the rest of the analysis.

[18]Since the dataset covers EU countries and Norway, we conservatively assign the global financial crisis period (from 2008 to 2009) to the other countries in our sample.

[19]This period is a proxy for the Euro area business cycle recessions defined by the Centre for Economic Policy Research. Source: `https://cepr.org/content/euro-area-business-cycle-dating-committee`.

[20]Notice that we cannot add *Nonperforming loans* in specification (8), since it shrinks the sample size making the estimation impossible with too many explanatory variables including country and year fixed effects.

Table 5: ROE-Targeting Propensity–Other Ownership

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Current top public holding	-0.020 (0.088)	0.15 (0.11)												
Current top institutional holding			-0.14 (0.094)	-0.047 (0.095)										
Current top insider holding					-0.084 (0.099)	-0.086 (0.14)								
Top FIVE holding							0.16 (0.18)	0.31 (0.23)						
Top public holding									0.028 (0.15)	0.18 (0.20)				
Top institutional holding											0.018 (0.14)	0.17 (0.21)		
Top insider holding													0.11 (0.087)	0.14 (0.11)
Size	0.95* (0.56)	1.21* (0.63)	0.88* (0.51)	0.83 (0.56)	1.58*** (0.57)	1.45** (0.68)	0.44 (0.58)	0.47 (0.62)	0.73 (0.54)	0.57 (0.63)	0.74 (0.54)	0.58 (0.63)	0.44 (0.54)	0.20 (0.59)
Cost-to-income ratio	0.032 (0.53)	1.18** (0.59)	-0.11 (0.54)	0.82 (0.52)	-0.56 (0.91)	0.30 (0.95)	-0.0024 (0.58)	0.70 (0.61)	0.047 (0.52)	0.75 (0.50)	0.047 (0.52)	0.75 (0.51)	0.12 (0.72)	0.89 (0.82)
Noninterest-to-interest income		0.14 (0.28)		0.085 (0.25)		-0.20 (0.30)		-0.042 (0.28)		0.0068 (0.26)		0.0087 (0.26)		-0.15 (0.22)
Loan growth		0.29 (0.37)		0.50 (0.38)		1.13** (0.44)		-0.16 (0.30)		0.14 (0.32)		0.14 (0.32)		0.32 (0.35)
Nonperforming loans		12.1*** (4.40)		6.02 (4.51)		8.61 (5.58)		1.56 (3.90)		0.084 (3.33)		0.14 (3.35)		0.78 (3.03)
Market-to-book ratio		0.32 (0.39)		0.38 (0.33)		1.14*** (0.44)		0.78** (0.34)		0.50 (0.34)		0.49 (0.34)		0.91*** (0.32)
Stock return		0.24 (0.41)		0.057 (0.38)		-0.40 (0.44)		-0.023 (0.30)		0.049 (0.32)		0.056 (0.32)		-0.11 (0.35)
Time means of the population	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1305	829	1332	840	836	513	1173	753	1298	830	1296	829	955	594
Number of banks	157	120	157	121	124	86	154	116	155	118	155	118	127	92
Pseudo R^2	0.21	0.25	0.20	0.22	0.26	0.30	0.21	0.23	0.18	0.20	0.18	0.20	0.21	0.22
Chi^2	1224	878	280	321	111	265	214	525063	187	612	188	1670	143	217
Prob>chi^2	0	0	0	0	4.4e-10	0	0	0	0	0	0	0	0	0

This table reports the estimated effect of different ownership forms on ROE-targeting propensity. The different ownership forms include the historical holdings of current big owners, institutional owners, and insiders (i.e. *Current top all holding*, *Current top institutional holding*, and *Current top insider holding*) and ownership concentration of different owner types (i.e. *Top FIVE holding*, *Top all holding*, *Top institutional holding*, and *Top insider holding*, where FIVE means the controlling shareholders holding at least five percent of voting rights). Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Loan growth* (annual growth rate of total net loans), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). *Time means of the population* represents all the individual time means of the explanatory variables, as explained in Section 4. In parentheses are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

18

Table 6: Propensity to Publish Explicit ROE Target Levels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stock-based compensation dummy	1.22*				1.29*			
	(0.64)				(0.71)			
Stock-based compensation		0.41***				0.51***		
		(0.14)				(0.16)		
Stock-based compensation/stock price			1.08***				1.05**	
			(0.38)				(0.43)	
CEO compensation				-0.051				-0.015
				(0.20)				(0.16)
Country-specific crisis	-1.30***	-1.40***	-1.37***	-1.20***				
	(0.40)	(0.41)	(0.43)	(0.44)				
Current top FIVE holding	0.21	0.20	0.23	0.36	-0.36	-0.24	-0.24	-0.28
	(0.22)	(0.21)	(0.22)	(0.30)	(0.36)	(0.33)	(0.34)	(0.24)
Size	0.91	0.94	0.71	1.12	1.81	2.17*	1.97	2.38**
	(0.67)	(0.70)	(0.73)	(0.77)	(1.11)	(1.22)	(1.21)	(1.07)
Noninterest-to-interest income	0.0075	-0.17	-0.28	0.16	0.66	0.47	0.25	0.26
	(0.31)	(0.32)	(0.34)	(0.38)	(0.54)	(0.57)	(0.60)	(0.50)
Market-to-book ratio	-0.22	-0.48	-0.31	-0.82	-0.048	-0.78	-0.48	-0.63
	(0.49)	(0.49)	(0.52)	(0.70)	(1.01)	(1.16)	(0.99)	(0.95)
Stock return	0.68**	0.80**	0.82**	0.85**	3.11***	3.49***	3.32***	2.79***
	(0.34)	(0.33)	(0.33)	(0.41)	(0.96)	(1.11)	(0.99)	(0.90)
Nonperforming loans	0.81	2.84	-0.21	-5.26	-4.66	-1.53	-7.20	
	(8.94)	(9.09)	(9.70)	(9.52)	(12.6)	(12.8)	(14.1)	
Time means of the population	YES	YES	YES	YES	YES	YES	YES	YES
Country fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	NO	NO	NO	NO	YES	YES	YES	YES
Observations	233	230	230	188	229	226	226	280
Number of banks	43	42	42	36	42	41	41	51
Pseudo R^2	0.30	0.31	0.32	0.29	0.44	0.45	0.46	0.34
Chi^2	27606	29869	31812	275	17277	12688	5208	514
Prob>chi^2	0	0	0	0	0	0	0	0

This table reports the estimation of banks' propensity to explicitly publish exact target numbers, with different specifications for Equation (2). The explanatory variables include *Country-specific crisis* (a dummy for the country-specific systemic crises defined by the European Central Bank), *Current top FIVE holding* (natural logarithm of total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Size* (natural logarithm of total assets in millions of US dollars), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), *Stock return* (One-year carry-trade stock return), *Stock-based compensation dummy* (a dummy variable indicating the existence of any stock-based compensation for the managers or employees), *Stock-based compensation* (natural logarithm of the actual stock-based compensation in millions of US dollars), *Stock-based compensation/stock price* (natural logarithm of the actual stock-based compensation relative to stock price), and *CEO compensation* (natural logarithm of total CEO compensation). *Time means of the population* represents all the individual time means of the explanatory variables in the selection equation, as explained in Equation (2) in Section 4. In parentheses are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Cost-to-income ratio as the exclusive restriction for targeting propensity.[21]

Banks with an incentive program based on stock-based compensation (*Stock-based compensation dummy*) are more likely to publish explicit target levels, and the effect of the compensation amount is more significant regardless of its absolute value (*Stock-based compensation*) or relative value to stock price (*Stock-based compensation/stock price*). Since stock-based compensation represents the extent to which the interests of managers are aligned with those of equity holders, its positive effect on the publishing tendency supports our prior that ROE targeting signals the commitment of managers to the interests of shareholders. Consistently, total CEO compensation (*CEO compensation*) is not significant in explaining this tendency. In addition, a published target number sets a clear performance goal that could force managers' turnover if the goal is not met during a reasonable period, and managers could negotiate for higher stock-based compensation in return beforehand. This is consistent with literature on the managerial power influencing compensation contracting (Bertrand and Mullainathan, 2001; Bebchuk et al., 2002; Bebchuk and Fried, 2003; Edmans et al., 2017).

In addition, stock market performance (*Stock return*), which indicates expectation of future earnings, has a significant positive effect, whereas economic crisis (*Country-specific crisis*) has a significant negative effect.[22]

Thus far, our results indicate a monitoring effect by current controlling shareholders on ROE targeting (Tables 3, 4, and 5) and an incentive effect of stock-based compensation on publishing explicit target levels (Table 6). Is there any relationship between these two effects? Besides the fact that controlling ownership has no significant direct effect on the propensity to publish target numbers (Table 6), it does not amplify the incentive effect of stock-based compensation (specifications (1), (2), and (3) in Table 7). At the same time, stock-based compensation have no direct effect on targeting propensity (specifications (4), (6), and (8) in Table 7) nor an intensifying effect on the monitoring effect of controlling ownership (specifications (5), (7), and (9) in Table 7). These results are consistent with the notion that incentive compensation is more specific and explicit, whereas ownership plays a greater role in overall corporate governance.

In short, in the context of ROE targeting, the incentive alignment of the compensation scheme coexists with and supplements the monitory effect of controlling ownership for some banks, although

---

[21]As demonstrated in Section 4, exclusive restrictions for targeting propensity are included in vector $\mathbf{X_{G,i,t}}$ in the selection equation, but not in vector $\mathbf{X_{M,i,t}}$ in the main equation. We use *Cost-to-income ratio* as the exclusive restriction when applying separate panel estimations because, for the baseline specifications, the error terms in the main equation and the selection equation are not correlated when applying simultaneously pooled estimations using Heckman's (1979) approach. In addition, the results for the separated panel estimations are the same when using both *Current top FIVE holding* and *Cost-to-income ratio* as the exclusive restrictions.

[22]The result is the same when we replace it with a universal crisis period (*Universal crisis*) covering the common economic recessions in Europe.

Table 7: Monitoring Effect versus Incentive Effect

	Publishing Target Number					Targeting ROE			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Stock-based compensation dummy	4.10*			-0.052	-0.13				
	(2.11)			(0.38)	(0.91)				
Current top FIVE holding*Stock-based compensation dummy	-0.93			0.027	0.027				
	(0.58)			(0.25)	(0.25)				
Stock-based compensation		0.86				0.023	-0.20		
		(0.55)				(0.092)	(0.21)		
Current top FIVE holding*Stock-based compensation		-0.11					0.078		
		(0.16)					(0.063)		
Stock-based compensation/stock price			0.88					-0.042	-0.26
			(0.69)					(0.18)	(0.32)
Current top FIVE holding*Stock-based compensation/stock price			0.058						0.074
			(0.19)						(0.088)
Current top FIVE holding	-0.28	-0.21	-0.25	0.44***	0.47***	0.48***	0.43***	0.49***	0.49***
	(0.38)	(0.36)	(0.35)	(0.15)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
Size	1.58	1.93	2.01*	1.10*	1.05*	0.93	0.84	1.04	1.02
	(0.98)	(1.19)	(1.21)	(0.63)	(0.61)	(0.64)	(0.61)	(0.64)	(0.64)
Cost-to-income ratio				1.33*	1.36**	1.41**	1.41**	1.40*	1.44**
				(0.70)	(0.69)	(0.71)	(0.66)	(0.72)	(0.69)
Noninterest-to-interest income	0.56	0.45	0.25	0.40	0.36	0.47	0.37	0.52	0.46
	(0.52)	(0.56)	(0.60)	(0.42)	(0.41)	(0.43)	(0.40)	(0.43)	(0.41)
Nonperforming loans	-7.67	-4.35	-6.26	8.54	9.27*	8.40	9.97*	8.19	9.91*
	(12.6)	(14.6)	(15.4)	(5.27)	(5.17)	(5.65)	(5.62)	(5.72)	(5.91)
Market-to-book ratio	-0.16	-0.81	-0.46	0.095	0.16	0.16	0.36	0.12	0.24
	(0.97)	(1.16)	(1.02)	(0.42)	(0.40)	(0.43)	(0.40)	(0.43)	(0.42)
Stock return	3.01***	3.47***	3.30***	0.21	0.36	0.19	0.27	0.21	0.33
	(0.92)	(1.10)	(1.00)	(0.42)	(0.41)	(0.41)	(0.38)	(0.42)	(0.41)
Loan growth				-0.042	-0.0020	0.021	0.16	-0.021	0.12
				(0.39)	(0.39)	(0.38)	(0.36)	(0.37)	(0.36)
Time means of the population	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	229	226	226	560	569	554	563	554	563
Number of banks	42	41	41	79	80	79	80	79	80
Pseudo R^2	0.45	0.45	0.46	0.25	0.26	0.25	0.26	0.25	0.26
Chi^2	11635	14181	21724	354	332154	423	246667	537	445029
$Prob>chi^2$	0	0	0	0	0	0	0	0	0

This table displays the monitoring effect of *Current top FIVE holding* (natural logarithm of total percentage of holdings by the current top controlling shareholders), the incentive effect of stock-based compensation (measured as an indicator, *Stock-based compensation dummy*, natural logarithm of the actual amount in millions of US dollars, *Stock-based compensation*, and natural logarithm of the actual stock-based compensation relative to stock price, *Stock-based compensation/stock price*) and their interactions, besides the specifications in Table 6. The controls are *Size* (natural logarithm of total assets in millions of US dollars), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). *Time means of the population* represents all the individual time means of the explanatory variables in Equations (1) and (2) in Section 4. In parentheses are the standard errors robust to some misspecification, and heteroskedasticity or within-panel serial correlation. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

21

an incentive compensation scheme could imply possible managerial power influencing compensation contracting.

5.3. Risk in the following year

As banks serve the broad economy by providing financing liquidity, how banks' business strategies influence 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. What would bank managers do to reach the set targets? What is the impact of "reaching for target"? Are the banks with higher targeting propensity more likely to default due to excessive risk taking? As explained in Section 4, we use the predicted probability of setting a target from Equation (1) to study its impact on the banks' risk in the following year as in Equation (3).

Table 8 reports the estimated within-bank effect of $\widehat{p1_{\text{targeting}}}$ on *Default risk* (probability of default within one year) in the following year. $\widehat{p1_{\text{targeting}}}$ is estimated from the second specification in Table 3 using *Size*, *Current top FIVE holding*, and *Cost-to-income ratio*, which must also be controlled here to ensure that the coefficient of $\widehat{p1_{\text{targeting}}}$ captures the ROE-targeting effect rather than its bank-level explanatory variables. Here, as well as in all the models for banks' risk in Section 5.3, parameter estimates are reported with bootstrapped standard errors to control for measurement error because the ROE-targeting likelihood is predicted, not the observed true value.

Contrary to the criticism on banks' excessive risk taking, banks with increasing ROE-targeting propensity have marginally lower probability of default in the following year. With the mildest effect of -53.4, among the baseline specifications (1), (2), and (3), one standard deviation increase (23%) of targeting likelihood implies a nontrival 12.3% reduction of default probability (more than one third standard deviation).

Since the holdings of controlling shareholders are the main ROE-targeting drive, this reduction of default risk suggests that the controlling shareholders enforce monitoring on banks' management to ensure the banks' survival, ensuring the shareholders a chance to get a return from their investment, since, fundamentally, shareholders are at the highest risk when a bank defaults.

On the other hand, *Incentive package*, which incorporates ROE as one of the performance metrics for the top managers' variable compensation, has no amplifying impact beyond targeting propensity. One reason could be that the target for compensation is much lower than that for overall bank return. Meanwhile, stock-based compensation, which incentivizes managers with stock valuation, has no significant impact on default risk after we control for ROE-targeting propensity. These results are consistent with those in Section 5.2 that the compensation scheme supplements the monitory effect of controlling ownership. In addition, *Market-to-book ratio*, which measures the market's expectation of future earnings, has a significant negative effect on default risk.

22

Table 8: Default Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1}_{\text{targeting}}$	-53.4*	-73.7**	-59.5*	-50.6*	-71.3**	-57.6*	-56.2*	-60.1*	-59.0
	(30.9)	(33.4)	(35.2)	(30.6)	(31.7)	(33.1)	(33.7)	(35.9)	(36.3)
Size	3.81	-0.80	-0.54	3.14	-1.40	-1.06	-3.37	-0.19	0.83
	(6.52)	(6.83)	(9.41)	(6.32)	(6.97)	(9.06)	(8.98)	(9.03)	(9.14)
Top current FIVE holding	2.03	5.20**	3.91	2.05	5.17**	3.88	3.68	4.00	4.00
	(2.50)	(2.61)	(2.62)	(2.46)	(2.54)	(2.54)	(2.59)	(2.69)	(2.67)
Cost-to-income ratio	3.27	0.035	-9.23	4.06	0.37	-8.88	-8.01	-9.05	-9.08
	(11.8)	(14.5)	(14.7)	(12.0)	(14.7)	(14.5)	(14.2)	(15.1)	(15.0)
Noninterest-to-interest income	-4.12*	-4.43	0.27	-4.00*	-4.30	0.37	-0.13	0.43	0.57
	(2.39)	(3.04)	(3.17)	(2.32)	(3.06)	(3.28)	(3.10)	(3.22)	(3.19)
Loan growth	6.19	8.51*	6.25	6.25*	8.53*	6.25	6.59	6.29	6.14
	(3.87)	(4.46)	(4.99)	(3.71)	(4.48)	(5.08)	(5.06)	(4.99)	(4.74)
Nonperforming loans		34.7	-0.16		34.2	-0.23	6.70	0.39	0.13
		(30.4)	(29.8)		(30.5)	(29.3)	(28.6)	(28.9)	(29.5)
Market-to-book ratio			-18.0***			-18.0***	-18.0***	-18.1***	-18.4***
			(3.26)			(3.41)	(3.37)	(3.46)	(3.33)
Stock return			-2.97			-2.99	-3.11	-3.14	-3.10
			(2.11)			(2.08)	(2.11)	(2.13)	(2.27)
Incentive package				1.71	3.15	3.22			
				(5.27)	(6.89)	(5.70)			
Incentive package*$\widehat{p1}_{\text{targeting}}$				-20.5	-20.5	-15.9			
				(18.3)	(21.5)	(19.5)			
Stock-based compensation dummy							6.69		
							(4.57)		
Stock-based compensation								-0.17	
								(1.31)	
Stock-based compensation/stock price									-2.72
									(2.29)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-35.4	5.64	2.90	-28.3	12.2	8.54	30.8	-0.71	-10.6
	(66.2)	(74.0)	(104)	(64.0)	(75.9)	(100)	(98.7)	(99.4)	(101)
Observations	860	587	573	860	587	573	573	569	569
Number of banks	123	93	89	123	93	89	89	88	88
R^2	0.382	0.430	0.494	0.384	0.432	0.495	0.499	0.494	0.497
Chi^2	123	146	261	144	183	277	257	232	254
Prob>chi^2	0	0	0	0	0	0	0	0	0

This table shows the estimated bank fixed-effect panel model for banks' *Default risk* (in percentage) in the following year, with different specifications for Equation (3). *Default risk* is the probability of default within one year, calculated based on Merton's (1974) model by applying Vassalou and Xing's (2004) computation procedure with iterative estimation. $\widehat{p1}_{\text{targeting}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *Incentive package* is a dummy for the existence of using ROE as a performance metric for the top managers' variable compensation. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 9: Default Risk–Crisis and Regulation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1_{targeting}}$	-56.2*	-77.3**	-62.0*	-26.9	-56.8*	-46.8	-60.1*	-83.3**	-71.6
	(32.1)	(34.5)	(35.3)	(28.7)	(32.7)	(34.6)	(35.2)	(39.8)	(55.7)
Universal crisis*$\widehat{p1_{targeting}}$	12.5**	13.1*	8.44						
	(6.30)	(7.22)	(7.37)						
Basel III*$\widehat{p1_{targeting}}$				-10.4	-3.38	4.61			
				(8.79)	(10.2)	(10.1)			
Capital Exercise*$\widehat{p1_{targeting}}$							-8.02	2.73	4.72
							(7.11)	(7.70)	(7.86)
Size	2.74	-1.88	-1.32	2.49	0.40	2.58	-2.25	1.91	3.39
	(6.40)	(7.13)	(9.19)	(6.86)	(7.38)	(10.1)	(9.96)	(10.4)	(16.6)
Current top FIVE holding	2.23	5.46**	4.07	2.46	4.69*	2.90	4.42	6.20**	5.19
	(2.59)	(2.75)	(2.68)	(2.35)	(2.53)	(2.60)	(2.79)	(2.87)	(4.59)
Cost-to-income ratio	4.08	0.93	-8.62	8.71	1.31	-8.22	0.75	-11.9	-29.7
	(11.8)	(14.6)	(13.9)	(12.0)	(14.0)	(14.4)	(16.8)	(20.9)	(24.2)
Noninterest-to-interest income	-4.18*	-4.50	0.12	-3.50	-4.30	1.03	-7.45**	-7.51**	-2.22
	(2.41)	(3.22)	(3.24)	(2.40)	(3.10)	(3.09)	(3.04)	(3.32)	(4.20)
Loan growth	5.94	8.11*	6.11	5.63	9.03*	6.40	6.25	7.82	4.17
	(3.77)	(4.47)	(4.88)	(3.75)	(4.71)	(5.59)	(5.55)	(6.35)	(7.32)
Nonperforming loans		33.2	-0.082		33.2	-2.84		66.9	39.4
		(30.0)	(30.0)		(30.4)	(29.7)		(41.5)	(37.3)
Market-to-book ratio			-17.7***			-19.1***			-21.4***
			(3.42)			(3.45)			(4.91)
Stock return			-3.24			-2.87			-2.86
			(2.17)			(2.14)			(4.30)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-24.5	17.9	11.8	-24.7	-9.21	-32.0	19.1	-32.3	-52.4
	(65.1)	(77.4)	(101)	(68.9)	(79.3)	(110)	(103)	(112)	(183)
Observations	860	587	573	814	552	538	494	343	337
Number of banks	123	93	89	121	91	87	94	69	67
R^2	0.385	0.434	0.496	0.323	0.376	0.453	0.334	0.398	0.468
Chi^2	138	169	272	110	114	288	117	122	311
Prob>chi^2	0	0	0	0	0	0	0	0	0

This table displays the impact of banks' ROE-targeting probability on their *Default risk* (in percentage) in the following year during different periods, estimated using a panel fixed-effect model with different specifications for Equation (3). *Default risk* is the probability of default within one year, calculated based on Merton's (1974) model by applying Vassalou and Xing's (2004) computation procedure with iterative estimation. $\widehat{p1_{targeting}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *Universal crisis* takes value one for the period from 2008 to 2009 and from 2011 to 2013, identified as business-cycle recessions by the Centre for Economic Policy Research. *Basel III* takes value one from 2013 to 2018 and zero from 2007 to 2012 for the banks in the EEA, corresponding to the implementation periods of Basel Accords III and II, respectively. *Capital Exercise* is a dummy taking value one from 2011 to 2014 and zero from 2007 to 2010 for the banks within the EEA, representing the capital exercise conducted by the European Banking Authority to restore confidence in the banking sector. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 9 further demonstrates a crisis effect during a universal common crisis period (*Universal crisis*) as a comparison to the common regulatory periods. Intuitively, the risk reduction implied by increasing targeting propensity is significantly lower during an economic recession.

However, this risk reduction is not associated with different regulatory regimes, proxied by *Basel III* or *Capital Exercise*, within the European Economic Area. *Basel III*[23] takes value one during the implementation period of Basel Accords III and zero for Basel Accords II. Compared to the Basel II period, there is no significant risk reduction during the Basel III period with more stringent regulation of banks' capital adequacy. Yet, there is a limitation from using the implementation periods of the Basel Accords, since the Accords have been discussed and developed through the years and the expectation of more-stringent regulation arrives earlier than the actual implementation. Therefore, we further apply the quasi-experiment *Capital Exercise*[24] request for additional capital buffers, conducted by the European Banking Authority to restore confidence in the banking sector, as a proxy for regulation in our remaining tests. Here, the effect of *Capital Exercise* is not significant.

How do banks with more focus on "reaching for ROE" manage to reduce default risk? Through strengthening banks' earnings? Reducing asset risk? Increasing the capital buffer? Table 10 shows that targeting ROE does not significantly impact return on assets, asset risk, or book leverage, where the latter result contradicts the criticism that ROE-targeting banks use high leverage to compete with competitors.

On the contrary, banks with increasing targeting propensity have a significantly higher risk-based capital ratio, which is not reduced by crisis or amplified by more stringent regulation (Table 11). The effect on their Tier 1 risk-based capital ratio is the same, although a bit weaker (Table 12). Since risk-based capital ratio is defined as the ratio of regulatory capital to risk-adjusted assets, banks could achieve a higher capital ratio by increasing capital or reducing asset risk. Yet, the latter is not the case, as shown in Table 10.

In short, the reduced default risk is attributed to the increase of regulatory capital, which is not limited to Tier 1 capital, but it also hints at an increase of Tier 2 capital. Although default risk is influenced by economic recession, banks with increasing targeting propensity have a strategy of increasing regulatory capital reserves regardless of economic recession or regulatory regimes. Differently, *Capital Exercise* does have a positive effect on equity ratio (Table 13).

In addition, the effects on regulatory capital reserves are mostly driven by big banks (*BIG*, Table

---

[23]The implementation period for Basel Accords III is from 2013 to 2018 and from 2006 to 2012 for Basel Accords II. The European Union adopted the new legislative package, the Capital Requirements Directive IV, in 2013 to replace the Directive adopted in 2006. See https://eba.europa.eu/regulation-and-policy/implementing-basel-iii-europe.

[24]See https://eba.europa.eu/risk-analysis-and-data/eu-capital-exercise. Our *Capital Exercise* takes value one from the start of the one-off capital exercise in 2011 to the last capital regulation recommendation in 2014 and zero from 2007 to 2010, also under the implementation period of Basel II.

Table 10: Earnings, Leverage, and Asset Risk

	Return on assets			Equity-to-assets ratio			Asset risk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1}_{\text{targeting}}$	0.23	0.24	-0.00100	2.15	3.18	3.37	-19.6*	-22.4	-22.4
	(1.17)	(1.22)	(1.25)	(2.57)	(3.08)	(3.10)	(11.1)	(14.4)	(14.5)
Size	0.0022	-0.17	-0.18	-2.08**	-1.25	-1.31	-3.02	-0.0093	0.0046
	(0.30)	(0.30)	(0.29)	(0.81)	(0.90)	(0.92)	(2.91)	(3.04)	(3.25)
Current top FIVE holding	-0.12	-0.18	-0.15	-0.14	-0.23	-0.25	1.47	1.25	1.26
	(0.084)	(0.11)	(0.10)	(0.21)	(0.26)	(0.27)	(1.03)	(1.29)	(1.32)
Cost-to-income ratio	-0.76	-0.57	-0.32	-2.20**	-0.93	-0.68	-7.57*	-9.20	-9.11
	(0.49)	(0.60)	(0.64)	(0.98)	(1.14)	(1.18)	(4.28)	(5.75)	(5.74)
Noninterest-to-interest income	0.064	0.084	0.045	0.028	-0.051	-0.22	-0.072	-0.62	-0.39
	(0.070)	(0.070)	(0.094)	(0.19)	(0.30)	(0.24)	(0.88)	(0.88)	(1.11)
Loan growth	0.29	0.21	0.19	-0.27	-0.29	-0.27	1.51	2.58*	2.46
	(0.20)	(0.21)	(0.19)	(0.34)	(0.47)	(0.47)	(1.47)	(1.53)	(1.55)
Nonperforming loans		2.42	3.22		5.24	5.54		-2.44	-3.10
		(1.91)	(2.35)		(5.13)	(4.69)		(19.4)	(20.2)
Market-to-book ratio			0.45**			0.16			-1.32
			(0.19)			(0.26)			(1.63)
Stock return			0.13			-0.024			0.60
			(0.17)			(0.14)			(0.83)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	0.80	2.95	3.02	29.3***	21.2**	22.0**	75.5**	42.5	42.1
	(3.16)	(3.17)	(3.05)	(8.09)	(9.51)	(9.85)	(32.4)	(33.9)	(36.4)
Observations	970	669	653	971	670	654	544	479	466
Number of banks	136	105	101	136	105	101	93	92	87
R^2	0.087	0.127	0.170	0.250	0.223	0.240	0.404	0.405	0.411
Chi^2	94.1	112	102	130	134	124	121	127	144
Prob>chi^2	0	0	0	0	0	0	0	0	0

This table shows the estimated bank fixed-effect panel model for banks' *Return on assets* (in percentage), *Equity-to-assets ratio* (in percentage), and *Asset risk* (in percentage) in the following year, with different specifications for Equation (3). $\widehat{p1}_{\text{targeting}}$ is the estimated ROE-targeting probability from the second specification in Table 3. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 11: Risk-Based Capital Ratio–Baseline and Period Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1_{\text{targeting}}}$	15.1***	18.2***	18.5***	15.1***	18.3***	18.5***	19.0**	25.0***	25.3***
	(4.58)	(5.18)	(5.00)	(4.49)	(5.32)	(4.97)	(7.61)	(8.89)	(8.46)
Universal crisis*$\widehat{p1_{\text{targeting}}}$				-0.048	-0.43	-0.031			
				(0.97)	(1.08)	(1.11)			
Capital Exercise*$\widehat{p1_{\text{targeting}}}$							0.33	-0.82	-0.56
							(1.41)	(1.38)	(1.48)
Size	-2.13***	-2.03**	-2.21**	-2.12**	-2.01**	-2.20**	-3.59***	-3.65**	-3.49**
	(0.82)	(0.88)	(0.86)	(0.83)	(0.91)	(0.87)	(1.38)	(1.57)	(1.71)
Current top FIVE holding	-1.33***	-1.64***	-1.76***	-1.33***	-1.65***	-1.76***	-1.56***	-2.07***	-2.19***
	(0.42)	(0.47)	(0.46)	(0.42)	(0.49)	(0.46)	(0.58)	(0.70)	(0.65)
Cost-to-income ratio	2.13	3.30*	2.99*	2.13	3.28*	2.99*	3.73*	7.45***	6.12**
	(1.51)	(1.70)	(1.66)	(1.44)	(1.77)	(1.71)	(2.25)	(2.52)	(2.66)
Noninterest-to-interest income	0.29	0.16	-0.26	0.29	0.16	-0.26	0.39	0.33	-0.26
	(0.26)	(0.31)	(0.35)	(0.25)	(0.31)	(0.36)	(0.29)	(0.34)	(0.41)
Loan growth	-0.57	-0.72	-0.41	-0.56	-0.71	-0.41	-0.46	-1.10*	-0.87
	(0.50)	(0.59)	(0.60)	(0.48)	(0.60)	(0.60)	(0.63)	(0.59)	(0.68)
Nonperforming loans		-1.96	-1.37		-1.97	-1.37		-1.63	0.80
		(4.68)	(4.49)		(4.63)	(4.36)		(5.26)	(5.21)
Market-to-book ratio			0.46			0.46			0.52
			(0.50)			(0.50)			(0.77)
Stock return			-0.37			-0.37			-0.51
			(0.27)			(0.27)			(0.52)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	42.1***	42.0***	43.8***	42.1***	41.7***	43.8***	57.8***	60.6***	58.0***
	(8.77)	(9.56)	(9.28)	(8.89)	(9.93)	(9.49)	(14.7)	(17.4)	(18.7)
Observations	674	580	566	674	580	566	402	344	338
Number of banks	107	102	97	107	102	97	81	74	73
R^2	0.476	0.511	0.525	0.476	0.511	0.525	0.437	0.510	0.522
Chi^2	199	242	272	210	235	283	138	140	164
Prob>chi^2	0	0	0	0	0	0	0	0	0

This table displays the estimated bank fixed-effect panel model for banks' risk-based capital ratio (in percentage) in the following year, with different specifications for Equation (3). $\widehat{p1_{\text{targeting}}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *Universal crisis* takes value one for the period from 2008 to 2009 and from 2011 to 2013, identified as business-cycle recessions by the Centre for Economic Policy Research. *Capital Exercise* is a dummy taking value one from 2011 to 2014 and zero from 2007 to 2010 for the banks in the EEA, representing the capital exercise conducted by the European Banking Authority to restore confidence in the banking sector. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 12: Tier 1 Risk-Based Capital Ratio–Baseline and Period Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1}_{\text{targeting}}$	11.6**	13.9**	14.4***	11.5**	13.8**	14.2**	22.1***	23.0***	22.6***
	(5.04)	(5.94)	(5.44)	(5.18)	(5.89)	(5.63)	(8.32)	(8.80)	(7.93)
Universal crisis*$\widehat{p1}_{\text{targeting}}$				0.28	0.25	0.62			
				(0.86)	(1.00)	(1.11)			
Capital Exercise*$\widehat{p1}_{\text{targeting}}$							-0.16	-0.85	-0.58
							(0.91)	(0.95)	(1.01)
Size	-2.14**	-2.12*	-2.28**	-2.16**	-2.13*	-2.32**	-4.78***	-4.26***	-4.04***
	(1.02)	(1.16)	(1.12)	(1.02)	(1.13)	(1.17)	(1.34)	(1.42)	(1.55)
Current top FIVE holding	-1.02**	-1.23**	-1.35***	-1.01**	-1.22**	-1.34***	-1.75**	-1.81**	-1.86***
	(0.46)	(0.54)	(0.50)	(0.48)	(0.53)	(0.51)	(0.69)	(0.75)	(0.67)
Cost-to-income ratio	1.15	1.83	1.52	1.17	1.85	1.56	2.94	4.18	2.08
	(1.48)	(1.87)	(1.78)	(1.47)	(1.83)	(1.78)	(2.01)	(2.58)	(2.74)
Noninterest-to-interest income	0.28	0.15	-0.37	0.28	0.15	-0.38	0.32	0.26	-0.46
	(0.26)	(0.35)	(0.39)	(0.26)	(0.33)	(0.41)	(0.29)	(0.38)	(0.47)
Loan growth	-0.23	-0.069	0.23	-0.24	-0.072	0.23	-0.064	-0.52	-0.21
	(0.47)	(0.59)	(0.60)	(0.48)	(0.63)	(0.63)	(0.69)	(0.67)	(0.69)
Nonperforming loans		0.40	0.85		0.40	0.91		0.17	2.53
		(5.09)	(4.64)		(4.95)	(4.60)		(5.98)	(5.60)
Market-to-book ratio			0.55			0.58			0.45
			(0.55)			(0.55)			(0.93)
Stock return			-0.19			-0.20			-0.43
			(0.28)			(0.28)			(0.55)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	39.8***	40.0***	41.6***	40.0***	40.1***	42.0***	68.4***	63.6***	59.8***
	(11.1)	(12.7)	(12.3)	(11.1)	(12.3)	(12.8)	(14.7)	(16.1)	(17.2)
Observations	630	547	533	630	547	533	365	316	310
Number of banks	105	101	96	105	101	96	79	72	71
R^2	0.555	0.567	0.582	0.555	0.567	0.583	0.549	0.590	0.612
Chi^2	216	229	241	219	221	254	209	147	175
Prob>chi^2	0	0	0	0	0	0	0	0	0

This table displays the estimated bank fixed-effect panel model for banks' Tier 1 risk-based capital ratio (in percentage) in the following year, with different specifications for Equation (3). $\widehat{p1}_{\text{targeting}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *Universal crisis* takes value one for the period from 2008 to 2009 and from 2011 to 2013, identified as business-cycle recessions by the Centre for Economic Policy Research. *Capital Exercise* is a dummy taking value one from 2011 to 2014 and zero from 2007 to 2010 for the banks in the EEA, representing the capital exercise conduced by the European Banking Authority to restore confidence in the banking sector. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 13: Equity-to-Assets Ratio – Period Effect

	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{p1_{\text{targeting}}}$	1.97	3.09	3.21	-1.25	-0.94	-1.09
	(2.56)	(3.20)	(3.14)	(2.43)	(2.93)	(2.92)
Universal crisis*$\widehat{p1_{\text{targeting}}}$	0.66	0.35	0.56			
	(0.50)	(0.51)	(0.50)			
Capital Exercise*$\widehat{p1_{\text{targeting}}}$				1.64***	1.44**	1.50**
				(0.61)	(0.58)	(0.61)
Size	-2.12***	-1.27	-1.35	-2.23**	-1.23	-1.27
	(0.78)	(0.87)	(0.91)	(1.01)	(1.09)	(1.07)
Current top FIVE holding	-0.14	-0.23	-0.24	0.013	-0.0091	-0.0090
	(0.21)	(0.26)	(0.26)	(0.20)	(0.22)	(0.21)
Cost-to-income ratio	-2.17**	-0.92	-0.65	-4.47***	-3.17***	-2.84**
	(0.96)	(1.17)	(1.13)	(0.97)	(1.22)	(1.24)
Noninterest-to-interest income	0.026	-0.052	-0.23	0.19	0.24	0.017
	(0.20)	(0.29)	(0.24)	(0.24)	(0.33)	(0.30)
Loan growth	-0.28	-0.30	-0.27	0.62*	0.31	0.33
	(0.33)	(0.47)	(0.49)	(0.36)	(0.36)	(0.36)
Nonperforming loans		5.22	5.55		0.75	2.90
		(5.09)	(4.66)		(4.31)	(3.83)
Market-to-book ratio			0.19			0.19
			(0.24)			(0.22)
Stock return			-0.041			-0.064
			(0.14)			(0.21)
Year fixed effect	YES	YES	YES	YES	YES	YES
Constant	29.7***	21.5**	22.4**	29.7***	20.5*	20.7*
	(7.76)	(9.19)	(9.62)	(10.0)	(11.6)	(11.5)
Observations	971	670	654	566	396	389
Number of banks	136	105	101	104	78	76
R^2	0.253	0.224	0.244	0.284	0.195	0.214
Chi^2	130	141	130	85.1	58.6	69.1
Prob>chi^2	0	0	0	0	8.9e-07	6.4e-08

This table displays the estimated bank fixed-effect panel model for the period effect on equity-to-assets ratio (in percentage) in the following year, with different specifications for Equation (3). $\widehat{p1_{\text{targeting}}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *Universal crisis* takes value one for the period from 2008 to 2009 and from 2011 to 2013, identified as business-cycle recessions by the Centre for Economic Policy Research. *Capital Exercise* is a dummy taking value one from 2011 to 2014 and zero from 2007 to 2010 for the banks in the EEA, representing the capital exercise conducted by the European Banking Authority to restore confidence in the banking sector. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Table 14: Size Effect

	Risk-based capital ratio			Tier 1 risk-based capital ratio			Equity-to-assets ratio		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1}_{\text{targeting}}$	8.50**	12.5***	12.4***	6.13	8.45	8.75*	2.49	3.29	3.53
	(3.59)	(4.55)	(4.50)	(4.23)	(5.17)	(4.88)	(2.84)	(3.59)	(3.65)
BIG	1.53	1.41	1.02	2.42	2.40	2.01	0.13	0.15	0.091
	(1.33)	(1.39)	(1.30)	(1.60)	(1.78)	(1.68)	(0.41)	(0.42)	(0.43)
BIG*$\widehat{p1}_{\text{targeting}}$	9.08***	7.13**	8.35**	6.95**	5.83*	6.88*	-0.67	-0.28	-0.33
	(3.07)	(3.45)	(3.32)	(2.85)	(3.28)	(3.67)	(1.80)	(2.01)	(2.10)
Size	-1.70**	-1.69*	-1.83**	-1.89*	-1.84*	-1.99*	-2.11**	-1.26	-1.32
	(0.74)	(0.87)	(0.80)	(0.97)	(1.12)	(1.07)	(0.84)	(0.97)	(0.96)
Current top FIVE holding	-0.95***	-1.28***	-1.39***	-0.66*	-0.85*	-0.98**	-0.16	-0.23	-0.25
	(0.33)	(0.42)	(0.43)	(0.37)	(0.46)	(0.44)	(0.21)	(0.27)	(0.28)
Cost-to-income ratio	2.01	3.30*	2.89*	1.19	1.95	1.58	-2.18**	-0.92	-0.67
	(1.44)	(1.74)	(1.67)	(1.48)	(1.89)	(1.79)	(0.97)	(1.18)	(1.17)
Noninterest-to-interest income	0.25	0.18	-0.25	0.27	0.20	-0.30	0.031	-0.049	-0.22
	(0.24)	(0.30)	(0.37)	(0.25)	(0.32)	(0.38)	(0.20)	(0.30)	(0.25)
Loan growth	-0.67	-0.74	-0.42	-0.33	-0.092	0.20	-0.27	-0.29	-0.26
	(0.49)	(0.58)	(0.55)	(0.47)	(0.59)	(0.58)	(0.34)	(0.50)	(0.47)
Nonperforming loans		-1.13	-0.69		1.48	1.70		5.25	5.53
		(4.67)	(4.52)		(4.71)	(4.42)		(5.06)	(4.68)
Market-to-book ratio			0.27			0.28			0.16
			(0.46)			(0.47)			(0.25)
Stock return			-0.31			-0.11			-0.023
			(0.25)			(0.26)			(0.13)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	36.4***	37.3***	38.7***	35.8***	35.8***	37.2***	29.6***	21.3**	22.1**
	(7.93)	(9.40)	(8.66)	(10.4)	(12.2)	(11.6)	(8.38)	(10.2)	(10.1)
Observations	674	580	566	630	547	533	971	670	654
Number of banks	107	102	97	105	101	96	136	105	101
R^2	0.505	0.530	0.545	0.586	0.593	0.607	0.250	0.223	0.240
Chi^2	265	264	349	310	276	297	146	117	120
Prob>chi^2	0	0	0	0	0	0	0	0	0

This table displays the estimated bank fixed-effect panel model for the size effect on risk-based capital ratio (in percentage), Tier 1 risk-based capital ratio (in percentage), and equity-to-assets ratio (in percentage) in the following year, with different specifications for Equation (3). $\widehat{p1}_{\text{targeting}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *BIG* is a dummy for banks with total assets above EUR 200 billion at end of each year. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

14), especially for Tier 1 capital. This implies that big banks focused on ROE targets manage regulatory capital particularly well. Yet, this is not the case for systemically important banks (*SIB*, Table B1 in Appendix B). Notice that the coefficients for the interaction term of *SIB* and targeting likelihood are negative but not significant. Even though this result might be due to the limited observations of *SIB*, only from 2015 onward, it does reflect that *SIB* banks are more likely to create systemic risk and bring negative externalities into the system.

6. Conclusion

Since a bank's ROE target is a performance goal set for managers to reach a certain return to the shareholders, it reveals the comparative power of stockholders over managers within banks' corporate governance structure, as our results indicate. Specifically, the monitoring effect of the large controlling shareholders is reflected in banks' desire to set ROE targets, and the incentive effect of stock-based compensation is reflected in the choice to explicitly publish the target number. Yet, the link between stock-based compensation and the deep commitment associated with the propensity to publish explicit targets also indicates some managerial power in determining their compensation contracting.

Contrary to the criticism on banks' overleveraging to reach their ROE targets, banks becoming more likely to target ROE have higher regulatory capital reserves and, thereby, lower market-based probability of default in the following year. Especially, this increase of regulatory capital reserve is not influenced by economic recession or regulatory regimes and mostly driven by big banks. These results indicate that ROE targeting motivates managers to manage regulatory capital reserves well, although not to increase yearly ROA. However, the nonsignificant impact on book leverage, except for the quasi-experiment *Capital exercise*, does hint at concerns of potential high leverage from using ROE as a performance metric, noticed by Haldane (2009).

Our study contributes not only to the deep understanding of reaching for ROE itself, but also the link between bank corporate governance and risk taking. It is also highly relevant for policymaking regarding bank regulation. Yet, there is admittedly limitation of the publicly available data, especially concerning the inconsistent target levels. No doubt further studies on this topic with different data and aspects are needed.

7. Robustness checks

To check the robustness of our results, we first use a different prediction for the probability of targeting ROE: $\widehat{p2}_{\text{targeting}}$ estimated using *Size*, *Current top FIVE holding*, *Cost-to-income ratio*, and *Noninterest-to-interest income*. The results are qualitatively the same. Second, we count the

top 3 or 10 owners instead of top 5 owners and apply their ownership for the different owner types. Again, the results are qualitatively the same.

Appendix A: Additional information on data

Figure A1: Target number, actual ROE, and the achievement of targets
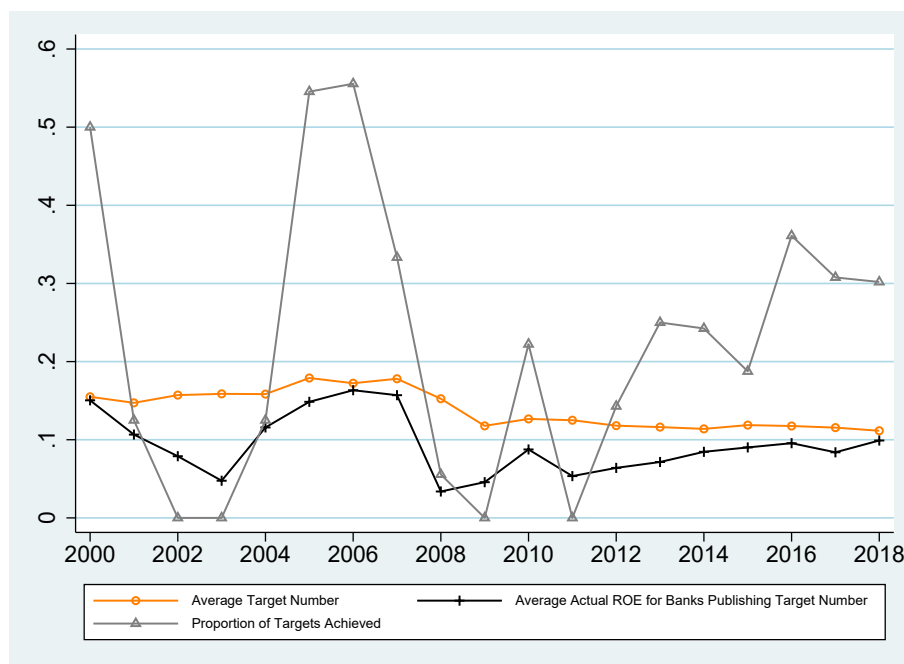
This figure shows, at the end of each year, the average published target number, the same as in Figure 1, the average actual ROE for the banks publishing target numbers, and the average proportion of the targets achieved.

Although the accuracy of the explicit target number is limited, the target level and its comparison with the realized ROE is informative. Similar as in Nielsen and Ohnemus (2018), Figure A1 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 (i.e., the number of realized ROEs higher than the corresponding targets set in the previous year). ROE target is less procyclical than realized ROE. Intuitively, banks set more stable and ambitious targets, which seem even more ambitious during an economic downturn, especially because most targets are for the medium or long term. This procyclicality is more apparent in the average achievement rate. For this comparison of one-year horizon, on average, 25% of the targets are achieved. Moreover, the dramatic shift to lower average target level since the global financial crisis persists, although it coincides to a certain degree with the shift of realized ROE.

Table A1 shows the number of observations and of publicly listed commercial banks with data on ROE targeting available across different European countries. The availability of the observations is partially due to differences in institutional settings, capital markets, accounting practices, and legal environments, and this heterogeneity is controlled in our analysis. Nevertheless, the distribution across countries is informative, since it shows which countries are more relevant in our study.

Table A1: Observations by country (188 banks in 29 countries)

Country	Observations	Number of banks
Austria	79	6
Belgium	36	2
Bulgaria	38	3
Croatia	88	7
Cyprus	34	3
Czech Republic	8	1
Denmark	274	24
Estonia	14	1
Finland	13	1
France	200	17
Germany	119	9
Greece	72	5
Hungary	19	1
Ireland	49	3
Italy	234	18
Liechtenstein	13	1
Lithuania	18	1
Luxembourg	7	2
Malta	24	2
Netherlands	23	2
Norway	237	29
Poland	106	11
Portugal	57	4
Romania	20	2
Slovakia	9	1
Spain	99	8
Sweden	98	7
Switzerland	69	5
United Kingdom	107	12

This table displays the distribution of our observation on *Targeting dummy* and number of banks across different countries in our sample.

Table A2: Variable definition

Variables	Definition
Targeting dummy	Valued as one for a bank year when ROE targeting is observed
Publishing number dummy	Valued as one when a bank publishes the explicit target number
ROE target number	Explicit target number published
Incentive package	Dummy for using ROE as one of the performance metrics for the top managers' variable compensation for the whole sample
Return on assets	Ratio of net income to total assets
Return on equity	Ratio of net income to total equity
Equity-to-assets ratio	Ratio of total equity to total assets
Default risk	Probability of default within one year, calculated based on Merton's (1974) model by applying Vassalou and Xing's (2004) computation procedure with iterative estimation
Asset risk	Ratio of total risk-adjusted assets to total assets
Risk-based capital ratio	Ratio of capital to risk-adjusted assets
Tier 1 risk-based capital ratio	Ratio of Tier 1 capital to risk-adjusted assets
Total assets	Total assets in millions of US dollars
Size	Natural logarithm of *Total assets*
Current top FIVE holding	Natural logarithm of share holdings (%) by the current top five FIVE owners, where FIVE means the controlling shareholders who directly or indirectly hold at least five percent of a voting class of a company's stock
Current top all holding	Natural logarithm of share holdings (%) by the current top five owners
Current top institutional holding	Natural logarithm of share holdings (%) by the current top five institutional owners
Current top insider holding	Natural logarithm of share holdings (%) by the current top five insider owners
Top FIVE holding	Natural logarithm of share holdings (%) by top five FIVE owners, where FIVE means the controlling shareholders who directly or indirectly hold at least five percent of a voting class of a company's stock
Top all holding	Natural logarithm of share holdings (%) by top five owners
Top institutional holding	Natural logarithm of share holdings (%) by top five institutional owners
Top insider holding	Natural logarithm of share holdings (%) by top five insider owners
Cost-to-income ratio	Natural logarithm of the total-expense-to-total-income ratio
Noninterest-to-interest income	Natural logarithm of the absolute value of noninterest income relative to interest income
Loan-to-deposit ratio	Natural logarithm of the ratio of total net loans to deposits
Nonperforming loans	Proportion of nonperforming loans to total loans
Loan growth	Annual growth rate of total net loans
Market-to-book ratio	Natural logarithm of the ratio of market capitalization to the book value of common equity
Stock return	Yearly carry-trade stock return
Stock-based compensation dummy	Indicator for the existence of any stock-based compensation for the managers or employees
Stock-based compensation	Natural logarithm of the total stock-based compensation in millions of US dollars
Stock-based compensation/stock price	Natural logarithm of the stock-based compensation in millions relative to stock price
CEO compensation	Natural logarithm of total CEO compensation in US dollars
BIG	Dummy for banks with total assets above EUR 200 billion at end of each year
SIB	Dummy for being reported as Systemically Important Banks by national regulators to the European Banking Authority since 2015

Appendix B: Systemically important banks

Table B1: Systemically Important Banks

	Risk-based capital ratio			Tier 1 risk-based capital ratio			Equity-to-assets ratio		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\widehat{p1_{targeting}}$	2.82	3.98	5.54	-2.67	-1.55	-0.63	4.49	5.28	7.69
	(8.71)	(9.91)	(10.8)	(8.57)	(9.55)	(9.97)	(3.00)	(3.88)	(4.87)
SIB	0.39	0.11	0.42	0.51	0.11	0.29	0.16	0.14	0.071
	(0.86)	(1.08)	(1.06)	(0.72)	(0.85)	(0.94)	(0.30)	(0.47)	(0.53)
SIB*$\widehat{p1_{targeting}}$	-8.26	-9.04	-10.8	-4.61	-3.76	-4.44	-2.46	-1.99	-3.82
	(7.96)	(10.2)	(10.2)	(7.65)	(9.49)	(9.64)	(2.14)	(3.17)	(3.81)
Size	3.65	2.95	3.49	4.15*	3.05	3.67	-1.31*	-1.79*	-1.96
	(2.51)	(2.79)	(3.33)	(2.12)	(2.39)	(2.88)	(0.72)	(0.94)	(1.25)
Current top FIVE holding	-0.28	-0.37	-0.38	-0.015	-0.062	-0.37	-0.61**	-0.64**	-0.36
	(0.82)	(0.85)	(0.85)	(0.80)	(0.77)	(0.82)	(0.24)	(0.30)	(0.31)
Cost-to-income ratio	2.03	1.25	1.30	1.27	0.45	0.42	0.11	0.069	0.41
	(1.99)	(2.46)	(2.70)	(1.88)	(2.60)	(2.69)	(0.95)	(1.39)	(1.28)
Noninterest-to-interest income	0.32	0.090	0.22	0.53	0.19	0.21	0.14	-0.26	-0.27
	(0.58)	(0.66)	(0.70)	(0.46)	(0.61)	(0.67)	(0.23)	(0.31)	(0.33)
Loan growth	1.55	3.22	3.54	1.90	3.77	3.85	-1.14**	-0.056	-0.11
	(1.65)	(2.69)	(2.84)	(1.18)	(2.35)	(2.46)	(0.47)	(0.47)	(0.49)
Nonperforming loans		-12.0	-15.4		-11.3	-12.9		5.53	5.31
		(13.3)	(14.2)		(13.2)	(13.7)		(4.33)	(4.65)
Market-to-book ratio			-0.99			-0.51			0.14
			(0.88)			(0.86)			(0.35)
Stock return			-0.030			-0.025			0.10
			(0.50)			(0.50)			(0.12)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-18.0	-9.88	-15.6	-25.6	-13.7	-19.4	24.0***	28.3***	29.1**
	(25.8)	(28.8)	(35.1)	(21.8)	(24.9)	(30.5)	(6.98)	(9.81)	(13.1)
Observations	232	206	198	229	203	195	354	237	228
Number of banks	99	94	89	98	93	88	132	98	95
R^2	0.130	0.155	0.190	0.157	0.175	0.209	0.249	0.297	0.287
Chi^2	16.2	10.3	16.6	20.8	14.7	17.8	69.2	42.3	33.1
Prob>chi^2	0.095	0.51	0.22	0.022	0.20	0.16	6.4e-11	0.000015	0.0016

This table displays the estimated of bank fixed-effect panel model for the effect of being systemically important banks on the risk-based capital ratio (in percentage), Tier 1 risk-based capital ratio (in percentage), and equity-to-assets ratio (in percentage) in the following year, with different specifications for Equation (3). $\widehat{p1_{targeting}}$ is the estimated ROE-targeting probability from the second specification in Table 3. *SIB* is a dummy for being reported by national regulators as Systemically Important Banks to the European Banking Authority since 2015. Other explanatory variables include *Size* (natural logarithm of total assets in millions of US dollars), *Current top FIVE holding* (natural logarithm of the total percentage of holdings by the current top five shareholders holding at least five percent of voting rights), *Cost-to-income ratio* (natural logarithm of the total-expense-to-total-income ratio), *Noninterest-to-interest income* (natural logarithm of the absolute value of noninterest income relative to interest income), *Nonperforming loans* (proportion of nonperforming loans to total loans), *Loan growth* (annual growth rate of total net loans), *Market-to-book ratio* (natural logarithm of the ratio of market capitalization to the book value of common equity), and *Stock return* (one-year carry-trade stock return). In parentheses are bootstrapped standard errors clustered at the bank level. The superscripts *, ** , and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

References

Basel Committee on Banking Supervision (2010). *Basel III: A global regulatory framework for more resilient banks and banking systems*. Basel: Bank for International Settlements. Retrieved from `https://www.bis.org/publ/bcbs189_dec2010.htm`.

Bebchuk, L. A., and Fried, J. M. (2003). Executive compensation as an agency problem. *Journal of Economic Perspectives*, *17*, 71–92.

Bebchuk, L. A., Fried, J. M., and Walker, D. I. (2002). *Managerial power and rent extraction in the design of executive compensation*. Working Paper 9068 National Bureau of Economic Research.

Bennett, B., Bettis, J. C., Gopalan, R., and Milbourn, T. (2017). Compensation goals and firm performance. *Journal of Financial Economics*, *124*, 307–330.

Bertrand, M., and Mullainathan, S. (2001). Are CEOs rewarded for luck? The ones without principals are. *The Quarterly Journal of Economics*, *116*, 901–932.

Black, F., and Scholes, M. (1973). The pricing of options and corporate liabilities. *Journal of Political Economy*, *81*, 637–654.

Burkart, M., Gromb, D., and Panunzi, F. (1997). Large shareholders, monitoring, and the value of the firm. *The Quarterly Journal of Economics*, *112*, 693–728.

Chen, X., Harford, J., and Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics*, *86*, 279–305.

Coase, R. H. (1937). The nature of the firm. *Economica*, *4*, 386–405.

Edmans, A., Gabaix, X., and Jenter, D. (2017). Executive compensation: A survey of theory and evidence. In B. Hermalin, and M. Weisbach (Eds.), *The handbook of the economics of corporate governance* (pp. 383–539). Elsevier volume 1.

Esty, B. C. (1998). The impact of contingent liability on commercial bank risk taking. *Journal of Financial Economics*, *47*, 189–218.

Fama, E. F., and Jensen, M. C. (1983a). Agency problems and residual claims. *Journal of Law and Economics*, *26*, 327–349.

Fama, E. F., and Jensen, M. C. (1983b). Separation of ownership and control. *Journal of Law and Economics*, *26*, 301–325.

Ferreira, M. A., and Matos, P. (2008). The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics*, *88*, 499–533.

Galai, D., and Masulis, R. W. (1976). The option pricing model and the risk factor of stock. *Journal of Financial Economics*, *3*, 53–81.

Grossman, S. J., and Hart, O. D. (1988). One share-one vote and the market for corporate control. *Journal of Financial Economics*, *20*, 175–202.

Haldane, A. (2009). Small lessons from a big crisis. Remarks at the Federal Reserve Bank of Chicago 45th Annual Conference "Reforming Financial Regulation", Chicago. Retrieved from `https://www.bis.org/review/r090710e.pdf`.

Hartzell, J. C., and Starks, L. T. (2003). Institutional investors and executive compensation. *The Journal of Finance*, *58*, 2351–2374.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica*, *47*, 153–161.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, *76*, 323–329.

Jensen, M. C., and Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*, 305–360.

Jessen, C., and Lando, D. (2015). Robustness of distance-to-default. *Journal of Banking & Finance*, *50*, 493–505.

Keeley, M. C. (1990). Deposit insurance, risk, and market power in banking. *The American Economic Review*, (pp. 1183–1200).

La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. (2002). Investor protection and corporate valuation. *Journal of Finance*, *57*, 1147–1170.

Laeven, L., and Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, *93*, 259–275.

Martin, G. P., Wiseman, R. M., and Gomez-Mejia, L. R. (2019). The interactive effect of monitoring and incentive alignment on agency costs. *Journal of Management*, *45*, 701–727.

McCahery, J. A., Sautner, Z., and Starks, L. T. (2016). Behind the scenes: The corporate governance preferences of institutional investors. *The Journal of Finance*, *71*, 2905–2932.

Merton, R. C. (1974). On the pricing of corporate debt: The risk structure of interest rates. *The Journal of Finance*, *29*, 449–470.

Merton, R. C. (1977). An analytic derivation of the cost of deposit insurance and loan guarantees an application of modern option pricing theory. *Journal of Banking & Finance*, *1*, 3–11.

Murphy, K. J. (1999). Executive compensation. In O. C. Ashenfelter, and D. Card (Eds.), *Handbook of Labor Economics* (pp. 2485–2563). Elsevier volume 3.

Murphy, K. J. (2012). Pay, politics and the financial crisis. In A. S. Blinder, A. W. Loh, and R. M. Solow (Eds.), *Rethinking the Financial Crisis* (pp. 303–344). New York: The Russell Sage Foundation.

Nielsen, C. Y., and Ohnemus, L. (2018). Etablering af mål for egenkapitalforrentning hos banker: Hvad kan aktionærerne forvente som afkast? *Finans/Invest*, (pp. 21–26).

Nyberg, A. J., Fulmer, I. S., Gerhart, B., and Carpenter, M. A. (2010). Agency theory revisited: CEO return and shareholder interest alignment. *Academy of Management Journal*, *53*, 1029–1049.

Pagratis, S., Karakatsani, E., and Louri, H. (2014). *Bank leverage and return on equity targeting: Intrinsic procyclicality of short-term choices*. Working Paper 189 Athens: Bank of Greece.

Saunders, A., Strock, E., and Travlos, N. G. (1990). Ownership structure, deregulation, and bank risk taking. *The Journal of Finance*, *45*, 643–654.

Semykina, A., and Wooldridge, J. M. (2018). Binary response panel data models with sample selection and self-selection. *Journal of Applied Econometrics*, *33*, 179–197.

Shleifer, A., and Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy*, *94*, 461–488.

Shleifer, A., and Vishny, R. W. (1997). A survey of corporate governance. *The Journal of Finance*, *52*, 737–783.

Vassalou, M., and Xing, Y. (2004). Default risk in equity returns. *The Journal of Finance*, *59*, 831–868.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. Cambridge: MIT press.