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Essays on Accounting for Financial Stability in the Banking Industry

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Introduction

The dissertation at hand focuses on the role of accounting in the aftermath of the 2007-2009 financial crisis. Particularly, concerns were raised about the impact of accounting rules, accounting discretions, and dividend payouts on bank behaviour. Consequently, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) set forth their revisions to accounting standards. Furthermore, there is an increased intervention by both the supervisors and regulators.

The first working paper titled "Dividends, Loan Loss Provisions, Lending: Early Evidence from European Banks" studies an important accounting choice by banks, that has triggered the change in accounting rules following the financial crisis. In it, I empirically examine whether the relationship between loan loss provisions (LLPs) and lending is influenced by banks' dividend payouts. The joint effects of binding of capital requirements and financing frictions induce banks to reduce lending. However, curbing cash dividends is another way that banks could resort to enhancing their capital ratios. Nevertheless, banks have chosen to distribute considerable dividends and thus lower bank capital. Using the results of the 2014 Asset Quality Review in Europe to identify delayed expected loan loss recognition (DELR), I find that the greater payout banks experienced significantly larger lending reduction associated with greater DELR. Payout policy also plays a significant role in maintaining lending when banks' equity experiences an adverse effect.

The second working paper, "Do Financial Statements Inform of Bank's Resilience: Evidence from EBA Stress Test?", proposes an accounting-based measure of bank's resilience to complement banking supervision (co-authored with Joshua Ronen). The measure is based on fair value of net assets, defined as the difference between fair value of assets and book value of liabilities. Using the ECB stress test 2014, we find that within-country our measure is significantly and positively associated with the stress test results, measured as the scaled shortfall or surplus of common equity tier 1 (CET1) capital (under the adverse scenario). Going further, we compare the predictive ability of the loan component of our measure and stress test result in predicting one-year-ahead credit losses (proxied by net charge-offs). Results show that our measure performs equivalent to the stress test results in the full sample. Further analysis reveals that our measure performs better in the passed subsample

while stress test results perform better in the failed group. We recommend using our measure as a complement to stress testing in identifying the bank's resilience to reduce operational constraints on stress testing framework.

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To my beloved parents and my brother

Dividends, Loan Loss Provisions and Lending: Early Evidence from European Banks

1.1. Introduction

The financial crisis of the late 2000s renewed the debate on the role of financial accounting rules on the stability of the financial system (Acharya and Ryan, 2016, Beatty and Liao, 2011, Financial Stability Forum, 2009, Vyas, 2011). In this regard, accounting for loan loss provisioning received considerable attention from bankers, regulatory bodies, and accounting standard setters. Specifically, the main criticism raised by regulators and policymakers to the incurred loss model (IAS 39) is its (lack of) timeliness in recognizing credit losses on loans (Chae et al., 2018, Dugan, 2009, Financial Stability Forum, 2009).[1] In response, both the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) introduced the expected credit losses model (ASC 326-20).[2]

Recent empirical work argues that an untimely approach to provisioning for loan losses might severely hamper a bank's ability to supply loans in the future, especially during the financial crisis (Beatty and Liao, 2011, Bushman and Williams, 2012, 2015, Domikowsky et al., 2015). The mechanism emphasized by the literature is that when concern of the regulatory capital ratio and the external financial frictions increase, banks are more likely to decrease risk-weighted assets, particularly lending. The incurred loan loss provisions exacerbate this relation by triggering more recognition of loan losses during economic downturns, and thus, putting more pressure on the required capital ratio.

Bank equity is affected not only by accounting and equity issuance decisions but also by payout policy. Restricting distributions essentially builds up bank's capital buffer and is argued to charge banks lower costs of funding (Gambacorta and Shin, 2018, Myers and Majluf, 1984, Shin, 2015). Nevertheless, shareholders may not appreciate such a strategy and may demand higher dividend distributions even if that comes at the cost of dissipation of capital buffer for expected loan loss, and, in some cases, capital buffer for unexpected

[1] Timely LLPs represent the mapping from changes in underlying loan quality, which is usually proxied by non-performing loans, to the loan loss provision. Whereas, larger LLPs represent an increase in the LLP regardless of underlying loan quality. For instance, larger LLPs are built up under the dynamic provisioning models during good times when loans are not necessarily non-performing (Nicoletti, 2018).

[2] Specifically, in July 2014, the IASB published the final version of IFRS 9 Financial Instruments including the new expected credit losses standard (CECL) while the CECL is included in a 2016 FASB standard Financial instruments—credit losses (topic 326): measurement of credit losses on financial instruments.

losses (Acharya et al., 2011, 2016, Baker et al., 2016, Boldin and Leggett, 1995, Floyd et al., 2015). This possible tension between the shareholders' interests and the public interest in maintaining financial stability has been underlined by academics, media, and policymakers. Particularly, Shin (2015) argued that "the common equity of the banks would have been substantially higher had dividends and equity buybacks been suspended at the beginning of the crisis".[3] In the same spirit, following the operation of the Single Supervision Mechanism (SSM) in 2014, the European Central Bank (ECB) annually issues recommendations to banks on their dividend distribution policies stressing "a conservative manner" to strengthen the safety and soundness of the euro area banking system have been issued (ECB, 2015a,b, 2016, 2017b).[4]

This study focuses on the dividend policy as an important mechanism constraining or enhancing the detrimental effects of delaying LLPs on bank lending. In particular, while greater delays in LLPs affect (accrual) capital, dividend payouts affect their economic capital. This speaks to the idea that banks' accrual adjustments to (accrual) capital directly affect their economic capital (Acharya and Ryan, 2016). Thus, the emphasis on the detrimental effect of delay in recognition of provisions for credit losses should be considered with the dividend distributions.

I employ a sample of 130 European banks subjected to the ECB Comprehensive Assessment (CA) to address the research question due to its two useful features. First, one component of the CA is an Asset Quality Review (AQR), which assessed the carrying value of participating banks' assets as of 31 December 2013. The breakdown results disclosed by the AQR provide an exogenous reference point to identify the delay in provisioning for loan losses, which is the gap between prudential loan loss provisions and banks' reported numbers.[5] Second, the launch of the Single Supervision Mechanism (SSM) is perceived to be a stricter regulation (Fiordelisi et al., 2017). That, in turn, may put higher pressure on

[3]He showed that the accumulated dividend distributions from 2007 to 2012 of twenty-eight banks in the Eurozone accounted for approximately 50% of the retained earnings of the banks.

[4]The U.S. newspaper Bloomberg reported on April 11, 2016, Euro-area "banks have paid out more than 100 billion euros to investors in this period. Had they returned less money, they would have more scope for lending and taking risks"(link: https://www.bloomberg.com/opinion/articles/2016-04-11/why-europe-s-bank-don-t-have-enough-capital).

[5]In this case, I assume that the results of the AQR capture the accumulated loss overhangs that carried forward from immediate period prior to the SSM (Bushman and Williams, 2015). See Figure 1.3 for an example of the disclosure of the AQR results.

banks' capital ratios allowing for the effect of LLPs on lending to be realized.[6]

I measure the timeliness in recognizing LLPs as the AQR-adjusted total provisions (a balance sheet item), which were reflected in a change in Common Equity Tier 1 (CET1) capital. Specifically, the greater the adjustment, the more the bank was considered to have been untimely in the recognition of expected losses that should have been recorded as part of other comprehensive income (OCI). The advantage of the measure is that it exploits the exogenous reference point provided by the AQR capturing the expectation of the ECB. Thus, it attenuates the measurement error when using estimated models in extant literature either following a pooled approach or time-series approach in estimating discretionary loan loss provisions (e.g. Nichols et al. (2009) and Beatty and Liao (2011), respectively).

In the first step of the empirical analysis, I assess whether the interaction between delayed loan loss provisioning and dividend distributions, measured as the ratio of the sum of dividends and repurchases minus issued equity to the sum of current earnings and lagged equities, is association with change in equity ratio.[7] I then assess whether the effect of delayed loan loss provisioning on lending is stronger for banks that paying more dividends. I document that the greater payout banks experienced a significantly larger lending reduction in associated with greater DELR. Payout policy also plays a significant role in maintaining liquidity provision when banks' equity experiences an adverse effect. Accordingly, this suggests that dividend payout is a channel through which LLPs affect banks' lending.

This study contributes to the literature in three ways. First, the paper contributes to the debate on the pro-cyclicality of LLPs and its association with bank lending over the business cycle (Beatty and Liao, 2011, Bushman and Williams, 2015, Domikowsky et al., 2015). Second, the study relates to the literature examining accounting discretion in banking. The consequences of increasing discretion over timing loan loss provisioning depend on how it is exploited (Bushman and Williams, 2012, Vyas, 2011). Finally, it contributes to a larger literature on prompt corrective action (PCA). In particular, Admati et al. (2014) and Gambacorta and Shin (2018) advocate dividend restrictions to promote the stability of the

[6]However, the effect may be absent if on average, the subjected banks were sufficiently well-capitalized prior to the SSM, they could absorb the additional losses induced by stricter supervision without having to recapitalize (Granja and Leuz, 2017).

[7]This measure is intended to capture the distribution of the distributable income. See Figure 1.4 for examples of banks' proposed allocation of distributable income.

financial system.

The rest of the paper is organized as follows: section 2 develops the empirical predictions; section 3 describes the institutional setting; section 4 outlines the research design; section 5 presents the empirical results and analysis, and section 6 concludes.

1.2. Related Literature and Hypothesis Development

The drying up of bank lending during the financial crisis of the late 2000s has raised concerns that the incurred loss approach of loan loss provisioning might exacerbate the pro-cyclicality of bank lending. Early empirical studies suggest that the backward-looking nature of the incurred loss approach of accounting for provisioning might be one explanation. According to this classical view, the credit risk of the loan portfolio is more likely to reduce during an economic boom and vice versa (Bikker and Metzemakers, 2005).[8] LLPs under the backward-looking accounting regimes are expected to reflect this feature in banks' balance sheets.[9] Consistent with this view, Bikker and Metzemakers (2005) provide evidence that bank LLPs are significantly higher when GDP growth is lower in OECD countries.

Subsequent empirical work is typically motivated by the binding of regulatory capital requirements and the existence of financing frictions due to asymmetric information (Acharya and Ryan, 2016, Beatty and Liao, 2011, Bushman and Williams, 2015, Domikowsky et al., 2015). Specifically, when a bank wants to increase its regulatory capital ratio, it has three potential strategies at its disposal: to increase its equity, to shrink the assets side of its balance sheet and proportionally reducing debt, or to decrease the risk-weighted assets by replacing riskier assets with safer ones. Elevated external financial frictions, i.e. asymmetric information and the "lemon's premium", especially during economic downturns may leave asset shrinkage as the feasible choice across the strategies (Myers and Majluf, 1984). In this vein, Beatty and Liao (2011) find that banks with greater delays in recognizing LLPs are

[8]This is consistent with literature on the pro-cyclicality of banks' lending behavior. Specifically, (Asea and Blomberg, 1998) empirically show that banks change their lending standards over the cycle, with laxer standards during economic expansions and tighter standards during economic downturns. Explanations are bank managers' short-term concerns for reputation (Rajan, 1994), institutional memory hypothesis (Berger and Udell, 2004), screening profitability (Ruckes, 2004), and bank competition (Ogura, 2006).

[9]Accounting constraints on forward-looking information in provisioning may hinder the anticipation of the accumulation of financial imbalances that credit risk is built up during economic booms and materializes during downturns.

more likely to curtail their lending during recessions. Furthermore, those banks build up less book capital during expansions and decline considerably greater book capital during recessions. The results suggest that banks with less delays in LLPs either face with less increase in the cost of raising capital during recessions or raise more capital to compensate their higher provisions during expansions. Bushman and Williams (2015) provide evidence supporting the former conjecture by finding that greater delays in LLPs are associated with higher opacity-driven illiquidity risks during recessions. Thus, banks with greater delays in LLPs faced with higher financing frictions are associated with raising new equity relative to banks with less delays. A working paper by Jayaraman et al. (2017) is related to the latter conjecture. They find that US bank holding companies that built buffers by preemptively provisioning experienced a weaker lending contraction when their capital was adversely affected and the beneficiary effect is absent in sample of banks with insider lending that presumably opportunistically smooth earnings.

However, issuing new equity is not the only way banks could resort to increase its capital. Increased retaining earnings via restricting dividends distribution would help to achieve a similar objective (Gambacorta and Shin, 2018, Shin, 2015). Besides, the higher level of retained earnings (less dividend payments) increases book capital and in turn may mitigate financing frictions since well-capitalized banks are perceived as less risky by bank depositors, debtors, and investors. Consequently, they have cheaper and more access to different forms of funding and increase lending at a faster pace. In particular, Gambacorta and Shin (2018) show that banks with a 1 percentage point increase in the equity-to-total-assets ratio experience a decrease of four basis points in the total cost of debt funding.

Based on that argument, the hypothesis is stated as follows:

H1. The effect of delays in expected loss recognition on subsequent lending is associated with dividend payouts.

1.3. Institutional Background

In 2012, the European Commission adopts historic proposals towards greater European harmonization by establishing a Single Supervisory Mechanism (SSM) led by the European Central Bank (ECB). The SSM officially assumed responsibility for the supervision of the

Eurozone banking industry on November 4, 2014. In the run-up to the SSM's implementation, the ECB and the European Banking Authority (EBA) conducted the CA in 2014 as an important preparatory work to check the health of participating banks. The ECB's selection criteria for the participating banks subject to SSM was not random but based on 'significance' criteria.[10]

The CA entailed two main activities: namely the asset quality review (AQR) and the stress test (ST). Specifically related to the study is the AQR, which was a thorough health check of the carrying value of banks' assets as of 31 December 2013. Given that loans represent a substantial amount of banks' assets, the main purpose was reviewing valuation of those assets. Indeed, out of nine AQR work blocks, six were specifically dedicated to loan books while only one block examined trading books (focusing on level 3 fair value exposures).[11] Its final result was a total €47.5 billion of adjustments to bank assets (ECB, 2014) and harmonization of asset quality metrics of participating banks, i.e. non-performing exposures (NPE) and fair value hierarchy (ECB, 2014).

The AQR comprised two phases. Phase 1 entailed a portfolio selection process following a risk-based approach to identify where on a bank's balance sheets the AQR adjustments could have a material effect on CET1. Phase 2 started with a process, policies and accounting review to determine further examination of banks' loan books and trading books. Loan books are subjected to credit analysis (including risk-based sample selection, credit file review, collateral, and real estate valuation, projections of findings of credit file review, and collective provisioning analysis).[12][13] Trading books are subjected to level 3 fair value exposures review (including non-derivative revaluation, core process review, and derivative pricing model review). The final output was an AQR adjusted CET1, which was €47.5 billion (ECB, 2014).

[10]Specifically, a bank was included if any of the following criteria fulfilled: (i) the total value of the bank's assets exceeds €30 billion, (ii) the ratio of the bank's total assets to GDP of its country of establishment exceeds 20%, unless the total value of their assets is below €5 billion, (iii) the institution is among the three largest credit institutions in a participating SSM Member State, regardless of size (ECB, 2014).

[11]The other two work blocks are (i) banks' processes, policies and accounting review and (ii) determination of AQR-adjusted CET1 ratio.

[12]The size of the sample determined by: the homogeneity of the portfolio, the risk of the portfolio, the total number of debtors and the level of debtor concentration (ECB, 2014).

[13]Portfolios were stratified based on debtors' riskiness and exposure size. Projection of findings was applied to homogeneous pools of exposure within each "strata" with two main projected metrics: impairment provisions and NPE reclassifications (ECB, 2014).

1.4. Research Design and Data

1.4.1. Sample Selection and Description

Data for the results of the CA assessment for each of the 130 participating banks were obtained from the ECB website. The initial sample was subject to the following adjustments: First, I exclude participating banks which were subsidiaries of other participating banks or merged or acquired by other participating banks by 31 Dec 2016 to avoid double counting loan portfolios or discontinuities in the balance sheet variables. Second, banks headquartered in Luxembourg and banks with no banking credit risk to avoid different business models are dropped. Third, I exclude banks that did not prepare their annual reports under IFRS or banks under restriction to distribute dividends in any year within the period from 2011 to 2013 or profit transfer agreements. This is because those banks had essentially no possibility to decide their payout policy. Finally, banks having missing data either on any NetPayout_Ratio from 2011 to 2013 or financial data are excluded. The final sample includes 72 banks from 18 Euro area countries. Table 1.1 describes the sample selection and composition process.

Annual data on banks' financial statements are obtained from the Bureau van Dijk's Orbis BankFocus and SNL Unlimited database. Due to the missing data of dividends distributed within the year, data were hand collected from the proposal for profit distribution by the Supervisory Board to the General Assembly. Data on share buy-backs are obtained from Bureau van Dijk's Zephyr database. I supplement financial data by hand-collecting missing data from the banks' annual reports.

1.4.2. Measures of delay in expected loss recognition

The AQR was a one-point in time assessment based on the financial reports of the year-end 2013. While it was of a prudential nature, the expectation of the ECB based on a uniform methodology and harmonized definitions provides an exogenous reference point to identify bank-level timeliness of LLPs. Specifically, the imposition of the standard NPE definition following the EBA implementing technical standards simplified approach identified material heterogeneity of banks' internal NPE definitions. Indeed, €135.9 billion

of NPE must be added to the €743.1 billion declared by banks (summing to €879.1 billion), representing a considerable increase of almost 20%. The ECB emphasizes that almost 30% of audited banks were less conservative than the ECB in recognizing NPE (ECB, 2014). Exploiting this setting, I identify banks with the greater AQR-adjustment to provisions on CET1 capital as those which were less timely in the recognition of expected losses that should have been recorded in financial statements. This measurement of timeliness in loan losses provisioning appears to be less subjected to the estimation errors that surfaced in the extant literature (e.g. Nichols et al. (2009) and Beatty and Liao (2011)). I assume that the results of the AQR capture the accumulated loss overhangs that carried forward from the immediate period before the CA (Bushman and Williams, 2015). In the results reported, the DELR variable is the AQR adjustment to LLPs (based on financial reports as of 31 December 2013) scaled by lagged total assets (as of 31 December 2012).[14] Figure 1.3 provides a representative example of the disclosure of the AQR's results.

1.4.3. Econometric model

DELR, Payout, and Equity

Because I argue that equity dissipation concerns underpin the influence of DELR and payout on lending, it is important to investigate the extent to which the interaction between DELR and payout affects their Capital Tier 1 ratios. I follow Beatty and Liao (2011)'s model with some modifications to estimate the following model:

$$\begin{aligned}\Delta Capital R1_{12-15,i} =& \beta_0 + \beta_1 DELR_{13,i} + \beta_2 D\_NetPayout_{11-13,i} \\ &+ \beta_3 DELR * D\_NetPayout_{11-13,i} + \Sigma\beta_k Controls_i + \theta_j + e_i\end{aligned} \tag{1}$$

where subscript i indexes the bank and all variables are defined in Table 1.2. $\Delta Capital R1_{12-15,i}$ is the change in Capital Tier 1 Ratio between the post (2014 and 2015) and the prior (2012 and 2013). $D\_NetPayout_{11-13,i}$ is an indicator variable equal to one if $NetPayout\_Ratio\_pre_i$ is greater than the median, and zero otherwise. The bank's $NetPayout\_Ratio\_pre_i$ is the $NetPayout\_Ratio_i$ averaged over the period of three years from 2011 to 2013. Equation (1) includes control fixed effect and controls for the following bank charac-

[14]The results are qualitatively the same if I scaled by lagged total net loans or reserves for loan losses.

teristics: $CapitalR1_{12,i}$ (capital ratio tier 1 ratio in 2012), $CapitalR1_{13,i}$ (capital ratio tier 1 ratio in 2013), *EBP*, *Size*, Δln_RWA, *DEP*, *NPL*, *Liquidity*, *RevenueMix*, *Risk*, *Control_sub*, *Public*, *Gov_Own* and *ST_2011* (Beatty and Liao, 2011, Gropp et al., 2019). I cluster the standard errors at the country level. As the number of clusters is relatively small (18), standard errors from clustered inference may exhibit downward bias. Thus, I also report wild bootstrapped clustered p-values, as recommended by (Cameron et al., 2008) generated using boottest command in Stata 15 (Roodman et al., 2019).

DELR, Payout, and Lending

To test the hypotheses, I follow Beatty and Liao (2011) and use OLS estimation of the following reduced form loan supply model with country fixed effects, clustering the standard errors by country:

$$\begin{aligned} NTL\_GR\_ratio_{12-15,i} =& \beta_0 + \beta_1 DELR_{13,i} + \beta_2 D\_NetPayout_{11-13,i} \\ &+ \beta_3 DELR * D\_NetPayout_{11-13,i} + \Sigma\beta_k Controls_i + \theta_j + e_i \end{aligned} \tag{2}$$

where subscript i indexes the bank and all variables are defined in Table 1.2.[15] The independent variable $NTL\_GR\_ratio_{12-15,i}$ is the ratio in total net loans between the before (2012 and 2013) and the after (2014 and 2015) period. $DELR_{13,i}$ is expected to have negative impact ($\beta_1 < 0$) and incrementally negative effect on lending when banks distribute dividends ($\beta_3 < 0$).

Following Bushman and Williams (2015) and Beatty and Liao (2011), I include $CapitalR1_{12,i}$ (Tier 1 risk-adjusted capital ratio, divided by 100) to control for concern about potential future capital constraints.[16] Following Ivashina and Scharfstein (2010), DEP, measured as the ratio of total deposits to total assets, is included to control for banks' vulnerability to short-term funding problems (i.e. banks' access to deposit funding). EBP is included to control for profitability. Banks with high profitability are more likely to have strong balance sheets, thus, a positive association between profitability and bank lending is expected. Following Acharya et al. (2018), NPL is included to control for asset

[15] Alternative measures of dependent variables are NTL_GR_{2014} and $\Delta loan_{2014}$. I acknowledge that the change in the level of total net loans is an imprecise measure of the flow of new loans, because the change in the level of total net loans is associated with loan maturity, prepayments, defaults, etc.

[16] According to the capital crunch hypothesis, the most recent level of the capital-asset ratio is relevant to future lending, since it is the current level that must meet regulatory standards.

quality. *Size*, measured as the natural logarithm of total assets, is included to control for banks' resources and sophistication. *LIQ*, which is the sum of cash and trading securities divided by total assets (in %), is included to control for alternatives of adjusting balance sheets. I include *Risk*, *RevenueMix*, *High_Corp_Loans*, and ΔNPL to control for differences in risk portfolio, revenue mix, banks' loan portfolio composition, and trend in adjusting non-performing loans, respectively (Bhat et al., 2018, Bushman and Williams, 2015). *Controlled_subs*, *Public*, and *Gov_Own* are included to control for differences in the ownership structure (Nichols et al., 2009).

An inherent challenge for the analyses involves disentangling change in loans rooted from the supply side and demand side, particularly given that the European banks in the sample are located in 18 participating countries. The specific concern is that differences in local economic conditions, including local economic shocks or differences in loan portfolio composition stemming from the lending demand of the surrounding area, could confound the examination of participating banks alone. I address the issue by using country fixed effect to control for time-invariant country-level factors (i.e. loan demands, the strictness of the national supervision, country-level opacity or the unavailability of information, etc.).

1.5. Empirical Results

1.5.1. Descriptive Statistics

Table 1.1, Panel B shows the distribution of banks over two payout groups and across countries. By construction, the number of observations between the two groups is equal. The majority of banks were from Germany, Italy, following by France, Spain, and Austria. Italian, German, and Austrian banks were approximately equally distributed into two payout groups while all French banks distributed high payout. Two-thirds of Spanish banks distributed low payout.

Table 1.3 presents descriptive statistics for the sample banks. Measures of change in loans show that there is a decreasing trend over the period after and before the SSM. Measures of delay in LLP show that on average, banks had to adjust their provisions by €404 million (accounting for 0.418% of their total assets or 0.607% of total loans). The

adjustments are relatively large given that loan loss provisions account for only 1.12% of total loans on average. Banks, on average, raise equity by 18.31% of their reserves, while median banks distributed 0.019% of their distributable income to their shareholders.

Table 1.4 provides the Pearson correlations. $DELR$ is negatively correlated with $NetPayout\_Ratio\_pre$, $CapitalR1$, and $Liquidity$, and positively correlated with EBP, $Risk$, ALL and DEP. The change in loan is negatively correlated with $RevenueMix$, which is the extent to which a bank relies on noninterest revenue, $DELR$, $Risk$, ALL and positively related to ΔNPL and $DELR$. $CapitalR1$ is negatively correlated with $Risk$ and ALL, and negatively correlated with change in loan but not significant.

Table 1.5 presents descriptive statistics separately for less and greater $DELR$, partitioned by payout policy. The table reveals that when banks distributed less, the delay measure is significantly different between the two groups, while differences in other observable dimensions are insignificant. However, when banks distributed more, greater delayed banks are more likely to subject to capital constraints and capital shortfalls as a result of the CA. Furthermore, greater delayed banks smaller size, greater deposits, lower asset quality, higher management quality, and higher risk portfolio compared to the less delayed banks. While the mean in change in loans is higher in less delayed banks comparing to greater delayed banks condition on the high payout group, the difference is insignificant.

Figure 1.2 Panel A and Panel B plot the change in Tier 1 equity ratios and change in loans against $DELR$ for two payout groups, respectively. In Panel A, the low payout group shows a steeper relationship between $DELR$ and changes in Tier 1 Capital Ratio, as is illustrated by the solid trend line, relative to the high payout group. In Panel B, while the low payout group experiences a similar relationship between $DELR$ and changes in loans, the high payout group shows a flatter relationship.

1.5.2. Main Results

Table 1.6 presents the results of estimating equation 1. Column 2 shows that the sign of $DELR$ is negative but insignificant while column 3 illustrates that $DELR$ has a significantly negative effect on Tier 1 capital ratio when banks distributed more.

Column 4-5 present the results when interacting $DELR$ and $D\_NetPayout$ with $Fail$,

respectively. There is no significant effect of $DELR$ on lending when banks fail any threshold of the ECB, either comparing to threshold of 8% for AQR adjusted CET1, or threshold of 8% in Baseline Scenario, or threshold of 5.5% in Adverse Scenario. While failing the CA is associated with the increase Capital Tier 1 Ratio, there is no incremental effect of banks distributing greater prior to the CA.

Table 1.7 shows the results of estimating equation 2 that is consistent with the results in Table 1.6. Particularly, column 2 reveals that the negative association between $DELR$ and change in lending is insignificant. Whereas, column 3 reveals that $DELR$ is significantly and negatively associated with lending when banks distributed more. These results are also economically meaningful, suggesting that the growth in loans is lower for less timely loan loss provisioning banks with higher dividend distribution rates by 8.6%.

Furthermore, column 5 reveals that capital constrained banks due to failing the thresholds designated by the EBA, reduced their lending if their distribution was greater prior to the AQR. These findings are consistent with Shin (2015)'s argument that the dissipation of capital buffer impairs banks' capability to lend when their capital is hit by adverse events.

1.6. Conclusion

The study provides evidence that the dividend distribution is an important mechanism constraining or enhancing the detrimental economic effects of delaying LLPs on bank lending. Specifically, the negative effect of DELR on lending occurs only in the group of high payout banks. Furthermore, the payout policy plays a significant role in maintaining liquidity provision when banks' equity experiences an adverse effect. One of the limitations of the paper is that the sample is composed of 'significant' banks in the Euro area that may reduce the generability of the results. Furthermore, Fiordelisi et al. (2017) find that prior to the AQR, the participating banks reduced their lending activity more than the less significant banks did in order to shrink their balance sheets and increase their capitalization. Consequently, banks' behavior prior to the SSM may contaminate the measure of the adjustment of the AQR.

Figures and Tables

Figure 1.1

Timeline of the 2014 EBA Comprehensive Assessment

This figure displays the timeline of the main events related to the 2014 EBA Comprehensive Assessment.

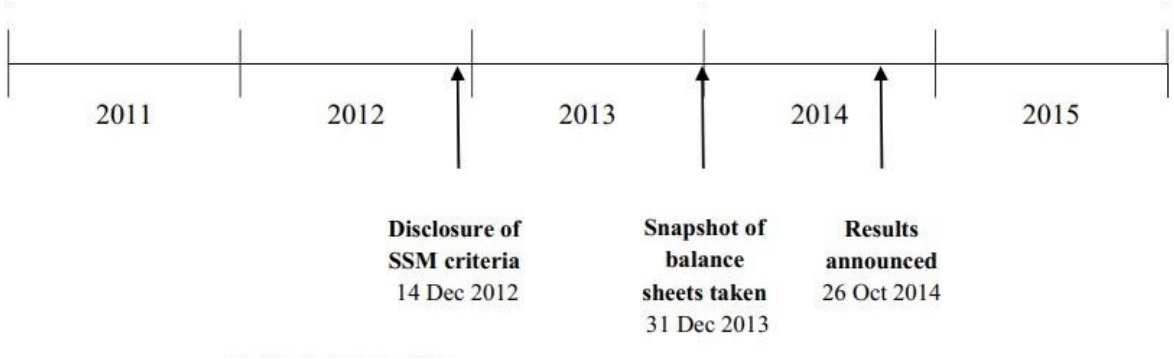
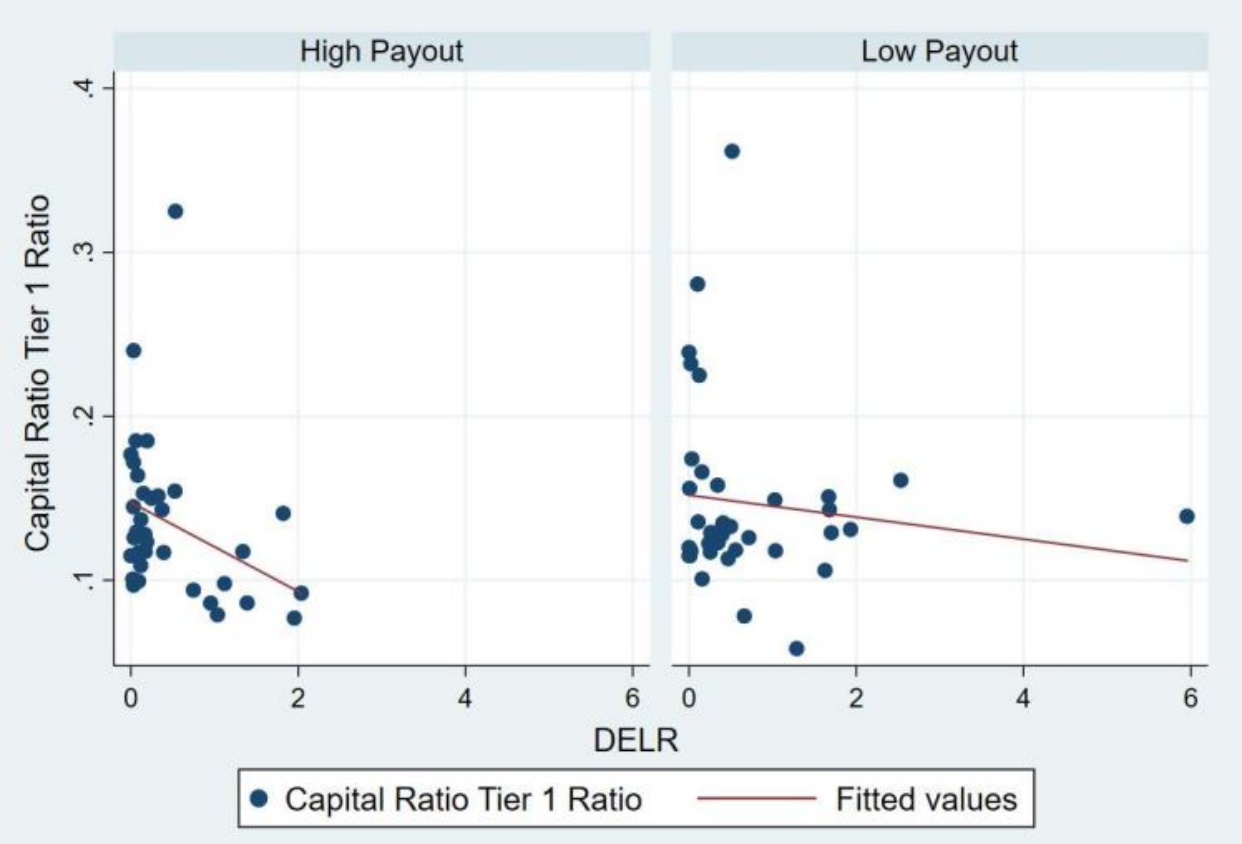


Figure 1.2

DELR, Tier 1 Capital Ratio, and Total_Net_Loans by Payout Groups

This figure displays the association between DELR and two dependent variables by payout groups. Panel A displays the association between DELR and Tier 1 Capital Ratio. Panel B displays the association between DELR and Change in Total Net Loans.

Panel A: Association between DELR and Tier 1 Capital Ratio by Payout Groups



Panel B: Association between DELR and Change in Total Net Loans by Payout Groups

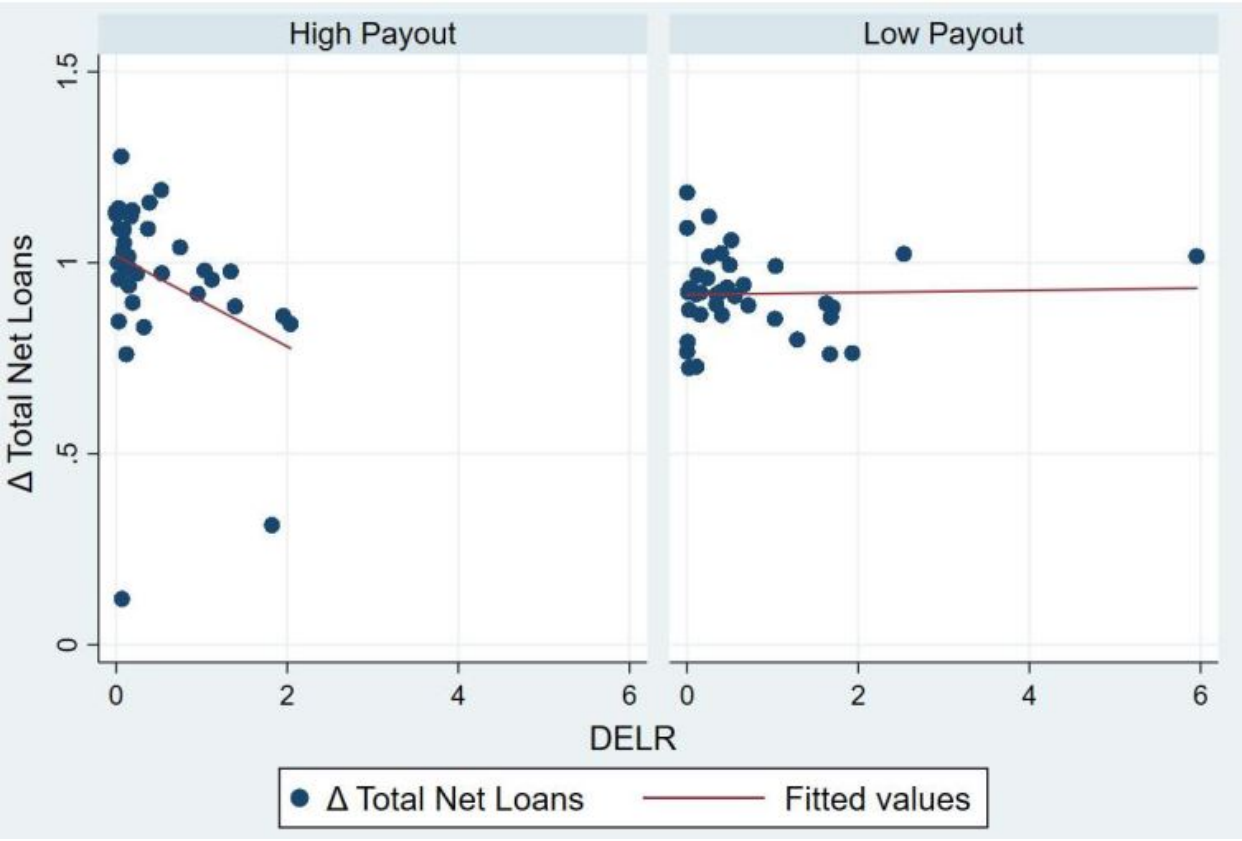


Figure 1.3

Examples of The Disclosure of CA Results

This figure displays the excerpts of the disclosure of Deutsche Bank AG's AQR main and breakdown results.

Item 1: AQR Main Results – Deutsche Bank AG

B MAIN RESULTS OF THE COMPREHENSIVE ASSESSMENT (CA)

B1	**CET1 Ratio at year end 2013 including retained earnings / losses of 2013 B1 = A6**	%	**13.40%**
B2	Aggregated adjustments due to the outcome of the AQR	Basis Points Change	-7
B3	**AQR adjusted CET1 Ratio B3 = B1 + B2**	%	**13.33%**
B4	Aggregate adjustments due to the outcome of the **baseline** scenario of the joint EBA ECB Stress Test to lowest capital level over the 3-year period	Basis Points Change	-78
B5	**Adjusted CET1 Ratio after Baseline Scenario B5 = B3 + B4**	%	**12.55%**
B6	Aggregate adjustments due to the outcome of the **adverse** scenario of the joint EBA ECB Stress Test to lowest capital level over the 3-year period	Basis Points Change	-455
B7	**Adjusted CET1 Ratio after Adverse Scenario B7 = B3 + B6**	%	**8.78%**

Capital Shortfall

		Basis Points [1]	Mill. EUR
B8	to threshold of 8% for AQR adjusted CET1 Ratio	0	0.00
B9	to threshold of 8% in Baseline Scenario	0	0.00
B10	to threshold of 5.5% in Adverse Scenario	0	0.00
B11	**Aggregated Capital Shortfall of the Comprehensive Assessment B11 = max(B8, B9, B10)**	0	0

Item 2: Matrix Breakdown of AQR Result – Deutsche Bank AG

AQR breakdown →

Asset class breakdown ↓

		D .A	D .B	D .C		D .D		D .E		D .F	
		Credit Risk RWA year end 2013	Portfolio selected in Phase 1	Adjustments to provisions on sampled files		Adjustments to provisions due to projection of findings		Adjustment to provisions due to collective provisioning review		Impact on CET1 capital before any offsetting impact	
	Units of Measurement	Mill. EUR	% of RWA selected in Phase 1	Basis Points	Mill. EUR	Basis Points	Mill. EUR	Basis Points	Mill. EUR	Basis Points	Mill. EUR
D1	**Total credit exposure**	**247,398.56**	**60 - 80%**	**3**	**103.90**	**2**	**54.68**	**2**	**67.90**	**-6**	**-226.48**
D2	**Sovereigns and Supranational non-governmental organisations**	5,010.35	0%	0	0.00	0	0.00	0	0.00	0	0.00
D3	**Institutions**	12,793.86	0%	0	0.00	0	0.00	0	0.00	0	0.00
D4	**Retail**	44,626.91	40 - 60%	0	0.00	0	0.00	0	0.00	0	0.00
D5	*thereof SME*	*2,868.58*	*0%*					*0*	*0.00*	*0*	*0.00*
D6	*thereof Residential Real Estate (RRE)*	*24,465.52*	*80 - 100%*	*0*	*0.00*	*0*	*0.00*	*0*	*0.00*	*0*	*0.00*
D7	*thereof Other Retail*	*17,292.82*	*20 - 40%*					*0*	*0.00*	*0*	*0.00*
D8	**Corporates**	114,847.63	80 - 100%	3	103.90	2	54.68	2	67.90	-6	-226.48
D9	**Other Assets**	70,119.80	<20%	0	0.00	0	0.00	0	0.00	0	0.00

Figure 1.4

Examples of the proposed allocation of distributable income

This figure displays the excerpts of the proposed allocation of distributable income at year-end by three banks in the sample.

Item 1: HSBC France, France Annual Report 2013

Second resolution

Voting under the quorum and majority conditions to transact ordinary business, the shareholders hereby approve the following proposed distribution of net profit for the year:

Net profit for the year.....	EUR331,373,925.23
Plus retained profits	EUR3,146,578,771.09
Total sum available for distribution.....	EUR3,477,952,696.32

To be distributed as follows:

Dividend of EUR1.78 per share to be paid.....	EUR120,039,332.06
Retained earnings	EUR3,357,913,364.26

According to the decision of the Board of Directors on 19 November 2013, an interim dividend amounting to EUR 1.78 per share has already been paid to the 67,437,827 shares issued at that date, for a total amount of EUR 120,039,332.06. As this interim dividend is equal to the total amount of the dividend, no final payment will be made.

Item 2: Intesa Sanpaolo, Italy Annual Report 2013

The Intesa Sanpaolo S.p.A. financial statements for 2013 report a net loss of 3,913,087,268.23 euro. In relation to the merger by incorporation of Sudameris S.A. during 2013 and of Centro Leasing S.p.A. carried out in 2013 and effective as of 1 January 2014, and to the net loss for the year, we submit the following for your approval:

	(euro)
Integration of the Legal reserve up to one-fifth of share capital at the date of the Shareholders' Meeting, using the Share premium reserve for a total of	716,993.27
Coverage of the loss for 2013 using the Share premium reserve for a total of	3,913,087,268.23
Distribution from the Extraordinary reserve of a unit amount of 0.05 euro to the 16,440,896,882 ordinary shares and non-convertible savings shares, pursuant to Article 29.3 of the Articles of Association, for a total of	822,044,844.10

Item 3: Banque PSA Finance, France Annual Report 2013

Third Resolution: Appropriation of income for Banque PSA Finance company

The Shareholders note that the income available for distribution for the year is €1,042,544,824.21, consisting of a net income for the year of €237,805,374.11 and retained earnings of €804,739,450.45 brought forward from the previous year.

The Shareholders resolve to appropriate this profit available for distribution as follows:

- to the payment of a dividend €222,868,800.00
- to the undistributable reserves: -€34,063,411.70
- to the retained earnings €853,739,436.26

The dividend of €20.10 per share shall be paid after the Shareholder's meeting of April 7, 2014.

The Shareholders note that under the former financial years 2010, 2011 and 2012 the dividends paid were respectively €14.00, € 48.00 and €25.30.

Table 1.1

Panel A: Sample Construction

Number of Individual Banks	Total Sample
Banks participated in the Comprehensive Assessment	130
Less: participating banks were merged or acquired by other participating banks by 31 December 2016	2
Less: participating banks were not a controlled subsidiaries of another participating bank	5
Less: exclusion of banks headquartered in Luxembourg	6
Less: exclusion of banks with no banking credit risk	4
Less: banks without IFRS reports	10
Less: banks were under restriction to distribute dividends in any year within the period from 2011 to 2013	9
Less: banks were under profit transfer agreements	1
Less: if missing any NetPayoutRatio from 2011 to 2013	18
Less: banks with missing financial data	3
Total Sample	72

Panel B: Sample Composition

	Payout Policy Prior to the AQR			
Country	Low Net Payout	High Net Payout	Number of Banks	Percent
Austria	3	3	6	8.33
Belgium	3	1	4	5.56
Cyprus	1	0	1	1.39
Estonia	1	1	2	2.78
Finland	0	3	3	4.17
France	0	8	8	11.11
Germany	7	5	12	16.67
Greece	2	0	2	2.78
Ireland	2	0	2	2.78
Italy	6	7	13	18.06
Latvia	2	0	2	2.78
Lithuania	0	1	1	1.39
Malta	0	2	2	2.78
Netherlands	2	2	4	5.56
Portugal	2	0	2	2.78
Slovakia	0	1	1	1.39
Slovenia	1	0	1	1.39
Spain	4	2	6	8.33
Total	36	36	72	100

Table 1.2

Variable Definitions

Variable	Definition
EBA Asset Quality Review Results	
$DELR_{13,i}$	Total adjustment to provision as a result of the AQR (based on banks' balance sheets as of 31 December 2013) scaled by total net loans as of 31 December 2012 (in %)
D_DELR	An indicator variable equal to one if DELR is greater than the median, and zero otherwise.
Accounting Data	
$NTL\_GR_{12-15,i}$	The value of total net loans (including to other credit institutions) in 2014 and 2015 over the value of total net loans (including to other credit institutions) in 2013 and 2012.
$\Delta CapitalR1_{12-15,i}$	The change in Tier 1 capital ratio between the post (2014 and 2015) and the prior (2012 and 2013).
Provision	Loan loss provision scaled by lagged total net loans.
Dividends	The level of dividend distribution appropriated from profit of the year (collected from annual reports).
NetPayout_Ratio	The sum of dividends and repurchases minus issued capital scaled by the sum of current earnings and lagged equities.
NetPayout_Ratio_pre	The average of NetPayout_Ratio over the period from 2011 to 2013
$D\_NetPayout_{11-13,i}$	An indicator variable equal to 1 if NetPayout_Ratio_pre is greater than the median, and 0 otherwise.
CapConstraint	An indicator variable equal to one if AQR adjusted CET1 Ratio is in the lowest decile, and zero otherwise.
Fail	An indicator variable equal to one if the bank failed the CA (either comparing to threshold of 8% for AQR adjusted CET1, or threshold of 8% in Baseline Scenario, or threshold of 5.5% in Adverse Scenario), and zero otherwise.
$CapitalR1_{12,i}$	Tier 1 risk-adjusted capital ratio at the end of 2012, divided by 100.

(continued on next page)

Table 1.2 *(continued)*

Variable Definitions	
Variable	Definition
$\text{CapitalR1}_{13,i}$	Tier 1 risk-adjusted capital ratio at the end of 2013, divided by 100.
Size	Natural log of total assets at the beginning of the year.
DEP	Total deposits divided by total loans at the beginning of the year.
ΔNPL	Change in nonperforming loans scaled by lagged total net loans.
NPL	Nonperforming loans divided by total net loans at the beginning of the year.
Liquidity	Cash and trading securities divided by total assets at the beginning of the year.
RevenueMix	Ratio of lagged noninterest revenue to lagged total revenue.
Risk	Total risk weighted assets divided by total assets at the beginning of the year.
Δln_RWA	Change in the logarithm of the risk-weighted assets (RWA) between the before (2012 and 2013) and the after (2014 and 2015) period.
High_Corp_Loans	An indicator for above-median corporate loans divided by total loans for the year, and zero otherwise.
Controlled_subs	An indicator variable equal to one if the bank is a controlled subsidiary, and zero otherwise.
Gov_Own	An indicator variable equal to one if the global ultimate owner of the bank is governmental authorities, and zero otherwise.
Public	An indicator variable equal to one if the bank is public listed, and zero otherwise.
ST_2011	An indicator variable equal to one if the bank attended the EU-wide stress test prior to the CA in 2011, and zero otherwise.
Macroeconomics Data	
Δune_rt	The change in the annual unemployment rate.
ΔGDP	The change in the gross domestic production.

Table 1.3

Descriptive Statistics

	N	Mean	SD	Min	P1	P25	P50	P75	P99	Max
DELR	72	0.607	0.896	0.000	0.000	0.074	0.257	0.851	5.953	5.953
NTL_GR_ratio	72	0.940	0.172	0.120	0.120	0.871	0.949	1.028	1.278	1.278
Fail	72	0.194	0.399	0.000	0.000	0.000	0.000	0.000	1.000	1.000
Size	72	11.38	1.542	8.285	8.285	10.41	11.29	12.33	14.52	14.52
CapitalR1_{12}	72	0.126	0.040	0.052	0.052	0.104	0.117	0.139	0.282	0.282
CapitalR1_{13}	72	0.140	0.052	0.058	0.058	0.115	0.129	0.152	0.361	0.391
EBP	72	0.009	0.013	-0.036	-0.036	0.003	0.007	0.013	0.072	0.072
DEP	72	0.596	0.184	0.098	0.098	0.481	0.622	0.717	0.988	0.988
ΔNPL	72	0.007	0.035	-0.133	-0.133	-0.001	0.003	0.015	0.194	0.194
NPL	72	0.072	0.082	0.000	0.000	0.022	0.048	0.095	0.440	0.440
Liquidity	72	0.083	0.070	0.001	0.001	0.033	0.065	0.109	0.337	0.337
RevenueMix	72	0.329	0.320	-1.710	-1.710	0.260	0.393	0.477	0.818	0.818
Risk	72	0.463	0.204	0.082	0.082	0.311	0.464	0.608	1.108	1.108
High_Corp_Loans	72	0.500	0.504	0.000	0.000	0.000	0.500	1.000	1.000	1.100
Controlled_subs	72	0.472	0.503	0.000	0.000	0.000	0.000	1.000	1.000	1.000
Public	72	0.500	0.504	0.000	0.000	0.000	0.500	1.000	1.000	1.000
Gov_Own	72	0.139	0.348	0.000	0.000	0.000	0.000	0.000	1.000	1.000
ST_2011	72	0.514	0.503	0.000	0.000	0.000	1.000	1.000	1.000	1.000
Δune_rt	72	0.056	0.104	-0.207	-0.207	-0.037	0.052	0.131	0.336	0.336
ΔGDP	72	0.011	0.023	-0.069	-0.069	-0.005	0.014	0.025	0.066	0.066
Sup_Power	72	10.85	1.991	5.000	5.000	10.00	11.00	12.00	14.00	14.00

The table presents the sample statistics of main variables. Data on stress test results are obtained from EBA website. Balance sheet data are collected from financial reports, Bankscope and SNL Financial. All variables are defined in Table 1.2.

Table 1.4

Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	ΔCapitalR1$_{12-15}$																
(2)	DELR	0.033															
		[0.786]															
(3)	CapShortfall	0.075	0.588														
		[0.535]	[0.000]														
(4)	D_NetPayout$_{11-13}$	-0.146	-0.164	-0.07													
		[0.225]	[0.170]	[0.558]													
(5)	NetPayout_Ratio_pre	-0.036	-0.728	-0.265	0.143												
		[0.767]	[0.000]	[0.024]	[0.232]												
(6)	Size	-0.505	-0.236	-0.247	0.014	0.018											
		[0.000]	[0.046]	[0.037]	[0.905]	[0.879]											
(7)	CapitalR1$_{12}$	0.284	-0.287	-0.357	0.069	0.107	-0.15										
		[0.016]	[0.014]	[0.002]	[0.567]	[0.371]	[0.209]										
(8)	EBP	0.127	0.434	-0.092	0.038	-0.431	-0.223	0.071									
		[0.292]	[0.000]	[0.442]	[0.752]	[0.000]	[0.059]	[0.552]									
(9)	DEP	0.339	0.398	0.184	-0.217	-0.266	-0.504	-0.22	0.358								
		[0.004]	[0.001]	[0.122]	[0.067]	[0.024]	[0.000]	[0.064]	[0.002]								
(10)	ΔNPL	-0.143	0.007	0.115	-0.221	0.035	0.076	-0.334	-0.129	0.138							
		[0.233]	[0.954]	[0.338]	[0.062]	[0.773]	[0.527]	[0.004]	[0.278]	[0.247]							
(11)	NPL	0.253	0.33	0.321	-0.349	-0.147	-0.177	-0.333	0.057	0.329	0.536						
		[0.033]	[0.005]	[0.006]	[0.003]	[0.217]	[0.138]	[0.004]	[0.634]	[0.005]	[0.000]						
(12)	Liquidity	-0.13	-0.211	-0.296	0.165	0.058	0.327	0.266	-0.052	-0.265	-0.205	-0.242					
		[0.279]	[0.075]	[0.012]	[0.167]	[0.630]	[0.005]	[0.024]	[0.663]	[0.025]	[0.084]	[0.040]					
(13)	RevenueMix	-0.007	0.16	0.198	0.167	-0.052	-0.033	-0.13	-0.023	0.119	-0.033	0.082	0.28				
		[0.954]	[0.180]	[0.096]	[0.161]	[0.665]	[0.782]	[0.275]	[0.851]	[0.320]	[0.782]	[0.496]	[0.017]				
(14)	Risk	0.306	0.393	0.334	-0.118	-0.097	-0.543	-0.3	0.294	0.454	0.166	0.603	-0.369	0.162			
		[0.010]	[0.001]	[0.004]	[0.322]	[0.416]	[0.000]	[0.011]	[0.012]	[0.000]	[0.163]	[0.000]	[0.001]	[0.173]			
(15)	Controlled_subs	0.418	-0.164	-0.184	0.056	0.127	-0.355	0.054	-0.068	0.17	-0.101	-0.03	-0.27	-0.249	0.081		
		[0.000]	[0.169]	[0.123]	[0.642]	[0.286]	[0.002]	[0.653]	[0.570]	[0.152]	[0.399]	[0.801]	[0.022]	[0.035]	[0.498]		
(16)	Public	-0.122	0.257	0.211	0.056	-0.13	0.087	-0.235	0.189	0.161	0.09	0.141	0.08	0.224	0.202	-0.501	
		[0.310]	[0.030]	[0.076]	[0.643]	[0.276]	[0.466]	[0.047]	[0.113]	[0.177]	[0.453]	[0.239]	[0.505]	[0.058]	[0.089]	[0.000]	
(17)	NL_GR_ratio	-0.14	-0.143	-0.264	0.137	-0.044	0.158	0.123	0.165	0.138	0.248	-0.126	0.022	0.019	-0.248	-0.14	0.137
		[0.246]	[0.230]	[0.025]	[0.252]	[0.711]	[0.184]	[0.303]	[0.167]	[0.249]	[0.036]	[0.293]	[0.851]	[0.874]	[0.036]	[0.239]	[0.253]

This table reports pairwise correlation coefficients. Data on stress test results are obtained from EBA website. Balance sheet data are collected from financial reports, Bankscope and SNL Financial. All variables are defined in Table 1.2. T-statistics are reported in square brackets below each point estimate.

Table 1.5

Mean comparison between subsamples

		D_DELR = 0		D_DELR = 1		Low vs. High DELR	
	Variable	Mean	Std Dev	Mean	Std Dev	Mean	t-stat
		(1)	(2)	(3)	(4)	(5)	(6)
D_NetPayout = 0	NL_GR_ratio	0.91	0.14	0.92	0.08	0.00	(-0.11)
	DELR	0.08	0.09	1.18	1.25	-1.10**	(-3.29)
	CapConstraint	0.00	0.00	0.18	0.39	-0.18	(-1.71)
	Fail	0.07	0.27	0.32	0.48	-0.25	(-1.76)
	NetPayout_Ratio_pre	-1.05	2.31	-63.9	268	62.8	(-0.87)
	Size	11.7	1.41	11.2	1.34	0.49	(-1.06)
	CapitalR1_{12}	0.13	0.05	0.12	0.03	0.01	(-0.81)
	EBP	0.01	0.01	0.01	0.02	0.00	(-0.62)
	DEP	0.56	0.17	0.68	0.14	-0.12*	(-2.27)
	ΔNPL	0.01	0.06	0.02	0.02	0.00	(-0.07)
	NPL	0.09	0.12	0.11	0.10	-0.01	(-0.40)
	ManQ	0.01	0.01	0.02	0.01	0.00	(-1.66)
	Liquidity	0.08	0.08	0.06	0.04	0.02	(-0.93)
	RevenueMix	0.15	0.59	0.35	0.14	-0.20	(-1.52)
	Risk	0.42	0.26	0.53	0.14	-0.11	(-1.62)
	Controlled_subs	0.57	0.51	0.36	0.49	0.21	(-1.21)
	Public	0.29	0.47	0.59	0.50	-0.31	(-1.82)
D_NetPayout = 1	NL_GR_ratio	0.99	0.22	0.93	0.21	0.06	(-0.75)
	DELR	0.09	0.07	1.04	0.60	-0.94***	(-7.39)
	CapConstraint	0.00	0.00	0.43	0.51	-0.43***	(-3.95)
	Fail	0.00	0.00	0.43	0.51	-0.43***	(-3.95)
	NetPayout_Ratio_pre	2.63	2.44	3.10	4.11	-0.47	(-0.43)
	Size	12.2	1.56	10.1	0.98	2.15***	(-4.59)
	CapitalR1_{12}	0.14	0.03	0.11	0.05	0.02	(-1.66)
	EBP	0.01	0.01	0.01	0.01	-0.01*	(-2.56)
	DEP	0.49	0.20	0.67	0.15	-0.18**	(-2.92)
	ΔNPL	0.00	0.01	0.00	0.04	0.00	(-0.25)
	NPL	0.03	0.02	0.07	0.04	-0.04***	(-4.28)
	ManQ	0.01	0.01	0.02	0.01	-0.01**	(-2.90)
	Liquidity	0.11	0.09	0.07	0.05	0.05	(-1.87)
	RevenueMix	0.33	0.26	0.46	0.12	-0.13	(-1.77)
	Risk	0.33	0.17	0.62	0.12	-0.29***	(-5.58)
	Controlled_subs	0.50	0.51	0.50	0.52	0.00	(0.00)
	Public	0.36	0.49	0.79	0.43	-0.42*	(-2.64)

This table reports means and difference in means between less delayed group and greater delayed group differently for low payout and high payout group. Column 5 presents the difference in means between less delayed and greater delayed banks. Column 6 shows the t-stats from a t-test. Significance at the .10, .05 and .01 level for two-sided tests is denoted by $*$, $**$ and $***$, respectively. All variables are defined in Table 1.2.

Table 1.6

Payout, DELR, and Capital Tier 1

	ΔCapitalR1$_{12-15,i}$				
	(1)	(2)	(3)	(4)	(5)
DELR	-0.007	-0.006	0.010	-0.027	
	[-0.544]	[-0.496]	[1.451]	[-1.459]	
	(0.586)	(0.715)	(0.239)	(0.292)	
D_NetPayout$_{11-13}$			0.038**		0.031*
			[2.271]		[1.782]
			(0.053)		(0.153)
DELR *			-0.044***		
D_NetPayout$_{11-13}$			[-3.444]		
			(0.072)		
Fail				0.009	0.042**
				[0.441]	[2.262]
				(0.607)	(0.087)
DELR * Fail				0.017	
				[1.306]	
				(0.310)	
D_NetPayout$_{11-13}$					-0.073**
* Fail					[-2.780]
					(0.192)
CapitalR1$_{12}$		-0.696	-0.964**	-0.707*	-0.865**
		[-1.720]	[-2.553]	[-1.853]	[-2.767]
CapitalR1$_{13}$		0.421	0.553	0.373	0.573
		[0.989]	[1.265]	[1.198]	[1.522]
Δln_RWA		-0.034	-0.010	-0.032	-0.010
		[-0.580]	[-0.201]	[-0.538]	[-0.187]
EBP		-0.657	-0.426	-0.567	-0.164
		[-1.482]	[-1.349]	[-1.351]	[-0.337]
Size		-0.005	-0.006	-0.006	-0.006
		[-0.879]	[-1.201]	[-1.110]	[-1.101]
DEP		-0.024	-0.053	-0.037	-0.018
		[-0.525]	[-1.449]	[-0.693]	[-0.395]
NPL		0.349*	0.415**	0.351	0.422**
		[1.796]	[2.570]	[1.703]	[2.353]
Liquidity		0.128	0.178	0.115	0.195*

Continued on next page

Table 1.6 ***(continued)***

	(1)	(2)	(3)	(4)	(5)
		[1.186]	[1.598]	[1.203]	[1.900]
RevenueMix		0.036	0.028	0.033	0.016
		[1.594]	[1.498]	[1.543]	[0.785]
Controlled_subs		0.020	0.019	0.023	0.018
		[0.909]	[0.939]	[1.148]	[0.977]
Public		0.025	0.026*	0.029	0.024*
		[1.644]	[1.829]	[1.583]	[2.003]
Gov_Own		0.048*	0.069***	0.050	0.070***
		[1.874]	[3.742]	[1.508]	[3.816]
ST_2011		-0.031*	-0.031	-0.025	-0.024
		[-1.970]	[-1.635]	[-1.403]	[-1.369]
Constant	0.049***	0.092	0.113	0.116	0.063
	[6.581]	[0.816]	[1.125]	[1.288]	[0.609]
Observations	71	71	71	71	71
R-squared	0.625	0.863	0.886	0.872	0.888
Country FE	YES	YES	YES	YES	YES

This table presents the results of estimating equation 1, which examines the effect of loan loss provision timeliness and dividend payout on change in equity, for the full sample. All variables are defined in Table 1.2. Standard errors are clustered at the country level (18 clusters). T-statistics are reported in square brackets below each point estimate. In parenthesis I report score wild cluster bootstrap p-values generated using boottest command in Stata 15 (Roodman et al., 2019). Significance at the .10, .05 and .01 level for two-sided tests is denoted by $*$, $**$ and $***$, respectively.

Table 1.7

Payout, DELR, and Lending

	$NTL\_GR_{12-15,i}$				
	(1)	(2)	(3)	(4)	(5)
DELR	-0.069	-0.037	-0.007	-0.018	
	[-1.668]	[-1.081]	[-0.192]	[-0.242]	
	(0.058)	(0.349)	(0.808)	(0.809)	
$D\_NetPayout_{11-13}$			0.064		0.056
			[1.249]		[1.152]
			(0.144)		(0.128)
DELR *			-0.086**		
$D\_NetPayout_{11-13}$			[-2.849]		
			(0.048)		
Fail				-0.153**	-0.063
				[-2.370]	[-1.633]
				(0.071)	(0.095)
DELR * Fail				0.024	
				[0.482]	
				(0.685)	
$D\_NetPayout_{11-13}$					-0.170***
* Fail					[-3.089]
					(0.041)
$CapitalR1_{12}$		0.713	0.324	0.073	-0.317
		[0.494]	[0.204]	[0.047]	[-0.175]
EBP		5.610	6.362	5.933	7.374**
		[1.492]	[1.739]	[1.731]	[2.373]
Size		0.072	0.066	0.065	0.059
		[1.664]	[1.569]	[1.560]	[1.527]
DEP		0.309*	0.247	0.298*	0.322*
		[2.025]	[1.418]	[2.096]	[1.857]
ΔNPL		1.735	1.679	1.345	1.049
		[1.528]	[1.475]	[1.304]	[1.276]
NPL		-0.516	-0.391	-0.233	0.017
		[-0.611]	[-0.458]	[-0.302]	[0.027]
Liquidity		-0.676**	-0.623**	-0.751**	-0.672**
		[-2.556]	[-2.446]	[-2.728]	[-2.324]
RevenueMix		0.130	0.122	0.153	0.124

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Table 1.7 *(continued)*

	(1)	(2)	(3)	(4)	(5)
		[0.786]	[0.732]	[0.938]	[0.784]
Risk		-0.228	-0.263	-0.306	-0.381
		[-0.947]	[-1.025]	[-1.188]	[-1.631]
High_Corp_Loans		0.015	0.007	0.019	0.012
		[0.255]	[0.111]	[0.352]	[0.247]
Controlled_subs		-0.042	-0.054	-0.080	-0.105
		[-0.564]	[-0.709]	[-1.036]	[-1.522]
Public		-0.024	-0.025	-0.034	-0.049
		[-0.424]	[-0.520]	[-0.639]	[-1.067]
Gov_Own		-0.080	-0.047	-0.096*	-0.070
		[-1.472]	[-0.614]	[-1.974]	[-1.056]
ST_2011		-0.083	-0.085	-0.116	-0.115*
		[-1.339]	[-1.301]	[-1.657]	[-1.882]
Constant	0.983***	0.045	0.168	0.274	0.369
	[38.835]	[0.112]	[0.510]	[0.759]	[1.143]
Observations	72	72	72	72	72
R-squared	0.226	0.527	0.542	0.547	0.567
Country FE	YES	YES	YES	YES	YES

This table presents the results of estimating equation 2, which examines the effect of loan loss provision timeliness and dividend payout on change in equity, for the full sample. All variables are defined in Table 1.2. Standard errors are clustered at the country level (18 clusters). T-statistics are reported in square brackets below each point estimate. In parenthesis I report score wild cluster bootstrap p-values generated using boottest command in Stata 15 (Roodman et al., 2019). Significance at the .10, .05 and .01 level for two-sided tests is denoted by $*$, $**$ and $***$, respectively.

Appendix

Table A1.1

Sample Banks	
Bank Name	**Country**
LowPay Group	
Alpha Bank, S.A.	Greece
AS SEB banka	Latvia
AS SEB Pank	Estonia
AXA Bank Europe SA	Belgium
Banca Carige S.P.A. - Cassa di Risparmio di Genova e Imperia	Italy
Banca Popolare Di Milano - Società Cooperativa A Responsabilità Limitata	Italy
Banco Bilbao Vizcaya Argentaria, S.A. (BBVA)	Spain
Banco Comercial Português, SA	Portugal
Banco de Sabadell, S.A. (Sabadell)	Spain
Banco Financiero y de Ahorros, S.A. (BFA/Bankia)	Spain
Banco Popolare - Società Cooperativa	Italy
Bankinter, S.A.	Spain
Bayerische Landesbank	Germany
Belfius Banque SA	Belgium
Caixa Geral de Depósitos, SA	Portugal
Commerzbank AG	Germany
DekaBank Deutsche Girozentrale	Germany
Erste Group Bank AG	Austria
Hellenic Bank Public Company Ltd	Cyprus
HSH Nordbank AG	Germany
Intesa Sanpaolo S.p.A.	Italy
KBC Group NV	Belgium
Landwirtschaftliche Rentenbank	Germany
Norddeutsche Landesbank-Girozentrale	Germany
Nova Ljubljanska banka d. d., Ljubljana	Slovakia
Piraeus Bank, S.A.	Greece
Raiffeisen Zentralbank Österreich AG	Austria
Raiffeisenlandesbank Niederösterreich-Wien AG	Austria
SEB AG	Germany
SNS Bank N.V.	Netherlands
Swedbank AS	Latvia
The Governor and Company of the Bank of Ireland	Ireland
The Royal Bank of Scotland N.V.	Netherlands
Ulster Bank Ireland Limited	Ireland
UniCredit S.p.A.	Italy
Unione Di Banche Italiane Società Cooperativa Per Azioni	Italy

Continued on next page

Table A1.1 ***(continued)***

Bank Name	**Country**
HighPay Group	
Aareal Bank AG	Germany
AB SEB bankas	Lithuania
Banca Piccolo Credito Valtellinese, Società Cooperativa	Italy
Banca Popolare Dell'Emilia Romagna - Società Cooperativa	Italy
Banca Popolare di Sondrio, Società Cooperativa per Azioni	Italy
Banca Popolare di Vicenza - Società Cooperativa per Azioni	Italy
Banco Santander, S.A. (Santander)	Spain
Bank Nederlandse Gemeenten N.V.	Netherlands
Bank of Valletta plc	Malta
Banque PSA Finance	France
BAWAG P.S.K. Bank für Arbeit und Wirtschaft und Österreichische Postsparkasse AG	Austria
BNP Paribas	France
Caja de Ahorros y M.P. de Zaragoza, Aragón y Rioja (Ibercaja)	Spain
Credito Emiliano S.p.A.	Italy
Danske Bank plc (Finland)	Finland
Deutsche Bank AG	Germany
DZ Bank AG Deutsche Zentral Genossenschaftsbank	Germany
Groupe BPCE	France
Groupe Crédit Agricole	France
HSBC Bank Malta plc	Malta
HSBC France	France
ING Bank N.V.	Netherlands
Investar (Holding of Argenta Bank- en Verzekeringsgroep)	Belgium
La Banque Postale	France
Landesbank Baden-Württemberg	Germany
Landesbank Hessen-Thüringen Girozentrale	Germany
Mediobanca - Banca di Credito Finanziario S.p.A.	Italy
Nordea Bank Finland Abp	Finland
OP-Pohjola Group	Finland
Österreichische Volksbanken-AG	Austria
Raiffeisenlandesbank Oberösterreich AG	Austria
RCI Banque	France
Société Générale	France
Swedbank AS	Estonia
Tatra banka, a.s.	Slovenia
Veneto Banca S.C.P.A.	Italy

Do Financial Statements Inform of Bank's Resilience: Evidence from EBA Stress Test?*

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2.1. Introduction

Since the financial crisis of 2007-2009, stress testing has been integrated into the ongoing supervisory toolbox by banking regulators and supervisors. In the United States, the first coordinated supervisory stress test was the 2009 Supervisory Capital Assessment Program (SCAP) (Hirtle and Lehnert, 2015). It was launched during the depth of the financial crisis and followed by the Federal Reserve's Comprehensive Capital Analysis and Review (CCAR) and the Dodd–Frank Act Stress Testing (DFAST) program. In the Europe Union (EU), the first EU-wide stress test exercise was also conducted in 2009 by the Committee of European Banking Supervisors (CEBS) (Hirtle and Lehnert, 2015).

While the policy objective of stress testing could be either microprudential or macroprudential, its operation and success is subjected to operational constraints (Baudino et al., 2018, BCBS, 2017).[1] Stress testing requires a great number of human resources both in terms of the number of staff and specialized technical expertise, including risks, capital regulations, financial accounting, macroeconomics, and modelling.[2] In addition, stress testing framework demands access to or availability of granular bank-specific data and its quality. Indeed, resourcing and data availability are ranked in the top three impediments to supervisory stress testing frameworks in the Basel Committee on Banking Supervision (BCBS)'s survey to authorities (BCBS, 2017).

In this paper, we introduce an accounting-based measure that is helpful in predicting stress test results to reduce supervisory operational constraints on stress testing. The measure, which is the fair value of net assets, conceptually reflects the liquidity value of a bank at the measurement date. In particular, fair value measure opts for the exit value approach in both U.S. Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS). Thus, the reported exit values measure the minimum value to shareholders under adverse economic environment, in which the bank has to sell its assets to settle its liabilities (Hodder et al., 2014, Ronen, 2008). In this sense, our measure captures

[1] See Baudino et al. (2018), BCBS (2017) for further review of supervisory stress testing practices.

[2] Basel Committee on Banking Supervision's survey completed during 2016 reveals that more than 250 full time equivalent staff have been directly devoted to the most recent EU-wide stress testing exercise (BCBS, 2017). The exercises also leverage contributions from many other functions (i.e. financial stability function, risk area function, and supervision function) and different authorities (i.e. national authorities, European Central Bank, and European Banking Supervision).

the bank's liquidity value under a stress scenario when all the bank's counterparties act adversely and extract the maximum liquidity possible under their contract terms.

For the purposes of the empirical analysis, we exploit the 2014 EU-wide stress test. This stress test is a component of the Comprehensive Assessment prior to the ECB assuming its single supervision regime and disclosed granular bank-level results under the baseline and adverse scenarios. The granularity of the data allows us to perform bank-level predictability analysis. We adopt Bartels (2015)'s modeling framework for analysing multilevel data to study both the between- and within-country association. This approach allows us to address and statistically test the cluster confounding problem, that is bank-level variables exhibit distinguished between- and within-country associations.

In our first set of tests, we find that within country, our measure is significant and positive associated with the stress test results, measured as the shortfall or surplus of common equity tier 1 (CET1) capital (under the adverse scenario). We next investigate whether the loan component of our measure performs better than the stress test results in predicting bank future performance, proxied by one-year-ahead net charge-offs (NCOs). The results show that our measure performed equivalent to the stress test results in the full sample. However, further analysis shows that our measure performs better in predicting NCOs for passed banks while stress test results perform better in predicting NCOs for failed banks.

To understand the reason that stress test results better perform in predicting one-year-ahead NCOs, we examine banks' activities of selling loans following the stress test. The intuition is that failed banks are more likely to be subjected to corrective actions by the competent authorities (i.e. a clean-up non-performing loans (NPLs) from their balance sheets). Such a clean-up activity may result in more losses on loan disposals and less charging off NPLs. We expect and find that failed banks are more likely to make losses on loan disposals following the stress test for a subsample of banks that report the gains (losses) on disposal or repurchase of loans (and receivables) line item.

Our paper makes several contributions to the literature. First, we mainly contribute to literature on measuring a bank's resilience under a stress economic environment. The SRISK measure of systemic risk proposed by Acharya et al. (2014) use only publicly available market data. To address the detachment of the SRISK measure from the financial institu-

tions' fundamentals, Iyengar et al. (2017) propose the CRISK measure based on financial statements. Their approach is applying "haircuts" to the assets during- and post-crisis periods. The stress scenario considered in both works is a 40% drop in the market equity index over six months. Our approach exploits the conceptual exit value approach of fair value measure to capture the bank's liquidating value under the stress liquidity scenario. Second, we contribute to literature on measuring liquidity creation, which proposes the notion of the "immediate cash-equivalent value" (Bai et al., 2018, Berger and Bouwman, 2009, Brunnermeier et al., 2012). Prior work, however, applies a fixed (static) liquidity weights to categorized assets and liabilities, thus, encounters the risk that those weights will change. We also speak to literature on mapping fair value measure to banks' fundamentals (Cantrell et al., 2014, Evans et al., 2014) and literature on early warning devices in identifying problematic banks (e.g., Fethi and Pasiouras, 2010, Kolari et al., 2019).

The rest of the paper proceeds as follows. Section 2 motivates our setting and develops our hypotheses. Section 3 presents background and theoretical development. Section 4 discusses the data and outline our empirical strategy. Section 5 presents our results. Section 6 concludes.

2.2. Related Literature and Contribution

Our study is related to literature on measuring a financial institution's vulnerability under an economic downturn. Acharya et al. (2014) propose a market based approach by considering one factor stress scenario, which is the drop of the stock market index by 40% over six-month horizon (so-called V-Lab stress test). Their expected capital shortfall conditional on this scenario (SRISK) is the difference between the prudent capital level and the left-over market capital after the stress scenario. Iyengar et al. (2017) propose a financial statement based approach to modify SRISK. Their approach includes two steps. First, during the stress scenario of 40% stock price drop, they identity which liabilities (both on and off-balance sheet) are callable and high quality assets needed to settle those liabilities. Haircuts are applied to remaining assets and losses are charged against the institution's book value of equity. Then, the institution's required loss absorption capacity is equal to 8% of left-over assets and is validated against the additional post-crisis haircuts to capture losses

and future defaults once the crisis has tapered off. Our measure contributes to this literature by identifying the bank's expected cash flows under the "stress" scenario that the bank's counterparties "run".

Our study is also closely related to growing literature on measuring banks' liquidity. Brunnermeier et al. (2012) propose the notion of Liquidity Mismatch Index (LMI), which measures the "immediate cash-equivalent value" of the bank across states. It is defined as the difference between the aggregating liquidity across assets and the aggregating liquidity across liabilities for different states of the economy. Berger and Bouwman (2009) provide the first empirical approach to measuring liquidity using the bank's balance sheet information. Specifically, they classify all balance sheet items (on- and off- balance sheet items) into three categories in terms of liquidity. Then, a fixed (static) liquidity weight is assigned for each category. Finally, the liquidity measures are the combination of the liquidity classification and weights. Bai et al. (2018) expand Brunnermeier et al. (2012) and Berger and Bouwman (2009) by explicitly focusing on the stress liquidity-withdrawal state and the development of the liability liquidity weights. Using the recursive construction, they specify the liability liquidity weights as a function of the contract maturity and the state of the economy. While Brunnermeier et al. (2012) call for a deviation from accounting paradigm, we argue that financial reporting does provide information that is ready to use to measure a bank's liquidity value.

In addition, this paper adds to literature on linking fair value information to banks' future fundamentals. Evans et al. (2014) examine how fair value information for a specific type of asset (interest-bearing investment securities) is associated with banks' future performances (such as realized income from those financial instruments). Cantrell et al. (2014) compare the predictive ability of net historical cost and fair value of loans in predicting realized credit losses (measured as future NCOs and NPLs). They find that fair value of loans does not provide incrementally useful information to net historical cost of loans in predicting credit losses.[3]

[3]This study is also closed to Blankespoor et al. (2013). They examine the ability of fair value leverage ratio in predicting market perception of the overall credit risk of the bank and bank failures relative to leverage ratios based on historical cost values and Tier 1 capital values. They find that fair value leverage ratios outperform other measures in predicting credit risk and bank failure that imply that fair value of financial instruments reflects more market perception of the bank's credit risk.

Finally, this study speaks to literature on developing early warning of a bank's fragility. This literature implements computer-based models to predict bank failure using accounting inputs, which are selected based on the basis of the CAMEL rating system (e.g., Fethi and Pasiouras, 2010). Particularly, Kolari et al. (2019) apply the multiple strategy ensemble method and identify that the main determinants of the stress test results are financial ratios related to profitability and impaired loans as well as macroeconomic variables at the country-level.

2.3. Background and Theoretical Development

2.3.1. EU Stress Tests

Our analysis draws on results from the EU-wide stress test in 2014. For background, we review the essential feature of this program.

EU-wide stress tests were originally conducted by the Committee of European Banking Supervisors (CEBS) in 2009 and 2010. On January 1, 2011, the European Banking Authority (EBA), the successor institution of CEBS, was established, assuming the responsibility to undertake the exercise.

The objective of the 2014 stress test exercise is to assess the resilience of European banks to adverse economic conditions.[4] This exercise was the first linked to an EU-wide asset quality review to ensure comparability and accountability of the starting point of the stress test. The 2014 stress test examines 123 banks from 22 European countries at the highest level of consolidation. Banks were subjected to two hypothetical stress scenarios developed in close collaboration among the European Systematic Risk Board (ESRB), European Commission, competent authorities (CAs), the European Central Bank (ECB) and the EBA covering the horizon from 2014 to 2016. The baseline scenario was based on the 2014 European economic winter forecast, which foresaw the continuing economic recovery in EU countries and the EU. The adverse scenario calibrated the financial and economic shocks from four sources of systematic risks: (i) an escalation in global bond yields; (ii) a further weakening of credit quality in European countries with weak demand, weak fundamental, and vulnerable banking systems; (iii) stalling policy reforms; and (iv) the shortage of neces-

[4]For this reason, it is considered to be a microprudential stress test (Baudino et al., 2018).

sary support for bank balance sheet repair. Forward-looking paths for key macroeconomic and financial variables are summarized in Table A2.1. In general, the adverse scenario is more severe than the baseline scenario.

The stress test was performed in a bottom-up fashion, such that the participating bank used its internal model to project the results. Consequently, CAs, including the ECB, challenged the submitted results to assure the quality and took full responsibility before submitting to the EBA. The results of the stress test were then publicly disclosed at aggregated and bank-level. We employ bank-level disclosure of capital surplus/shortfall against the threshold of 5.5% Common Equity Tier 1 ratio (CET1) for the adverse scenario in this study.[5] Figure 2.2 provides a schematic view of the 2014 EU-wide stress test.

2.3.2. Fair Value Measurement and Stress Test

Both the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) endorse fair value as exit value instead of other plausible values, such as entry value or current replacement cost (Hodder et al., 2014, Penman, 2007). International Financial Reporting Standard (IFRS) 13, *Fair Value Measurements* and Statement of Financial Accounting Standard No. 157 (FAS 157), *Fair Value Measurements* define fair value as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (FASB, 2006, IASB, 2011).

Conceptually, a fair value measurement is the price that a bank as a market participant in its principal (or most advantageous) market would receive or pay to exit (but without actual exit) its position in an orderly transaction at the measurement date. Under the same economic conditions, the exit price may differ among banks due to access to different markets. The variance may be mitigated in case of financial assets due to their fungible, exchangeable and passive nature (Leisenring et al., 2012).

Our proposed measure, the exit value of net assets (the difference between the exit values of assets and those of liabilities), exploits this current "exit value" perspective endorsed by accounting standard setters. Particularly, the measure reflects cash flows that could be

[5]See Figure 2.1 for an illustration of bank-specific disclosure of summary of adverse scenario outcome.

realized if the bank does not continue ("exit") its specific operations under current economic conditions and is primarily independent of the idiosyncratic risk associated with the bank's specific operation (Leisenring et al., 2012, Ronen, 2008). In that sense, the measure captures the "liquidating" value to shareholders or the bank's ability to settle its worst-case scenario, in which the bank has to sell its assets to settle its liabilities, under current market conditions.

Stress test results are conditional on the scenario design (Acharya et al., 2014). In practice, the scenarios vary significantly across jurisdictions in terms of nature of shocks, economic and financial factors, risk coverage, stress level, and trajectories (Acharya et al., 2011, BCBS, 2017). The results of the stress tests are pivotal in assessing bank capital adequacy against those scenarios.

The stress scenario captured by our measure is the classical "counterparty run". Thus, the exit value of net assets reflects bank-specific liquidity position or resilience against this hypothetical worst-case scenario, in which all the bank's counterparties extract the maximum liquidity possible under their contract terms. This "counterparty run" is central to banking models (Brunnermeier and Pedersen, 2009, Diamond and Dybvig, 1983) and its enormous role has been reignited in the 2007 - 2009 financial crisis (Bai et al., 2018). Policymakers have promptly taken actions to deal with liquidity risk ahead of research. For example, the Basel III committee has introduced minimum liquidity standards for commercial banks, including two metrics: the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR).

Given that the objective of the stress test results and our measure is to capture the bank's resilience against a severe stress scenario, we expect that our measure is a good predictor of stress test results. We state our hypothesis as follows:

H1: Fair value margin is positively associated with banks' performance under stress testing.

2.4. Data and Research Design

2.4.1. Sample Construction and Data Collection

The sample starts with 123 European banks subjected to the ECB 2014 stress tests. We exclude banks whose 2013 financial reports could not be retrieved and banks that did not disclose fair values of assets on their notes to financial statements. The final sample is composed of 101 banks from 19 European countries.[6] Table 2.1 illustrates the sample selection process and sample composition.

We combine publicly available bank-level stress test results with accounting information from SNL Financial data. Fair values of historical cost assets are hand-collected from notes of financial statements. We also match the data with capital market data from Thomson Reuters for 56 sample banks that are publicly listed.

2.4.2. Fair Value Margin

Ideally, the fair value margin would be measured as the difference between fair value of total assets and fair value of total liabilities. For assets and liabilities recognized at historical cost, we hand collected fair values from notes to financial statements, which provide sufficient data for loans and held-to-maturity securities. Unfortunately, this is not the case for equity investment, deposits, and bonds. We, therefore, measure the fair value margin by subtracting book value of total liabilities from the sum of fair values of assets recognized and disclosed at fair value, historical costs of available-for-sale securities, which were not reliably measured at fair value, and held-to-maturity securities. The metric is then scaled by book value of equity to account for differences in size.

In the credit loss prediction test, we disaggregate the fair value margin to loan component, which is measured as the difference between fair value of loans to historical cost of loans scaled by total net loans.

2.4.3. Research Design

Stress Test Prediction Test

[6] Table A2.2 provides a full list of sampled banks.

Our final sample is composed of 101 banks from 20 countries. The heterogeneous distribution of banks between many countries raises a concern of *cluster confounding*.[7] This problem occurs when a bank-level covariate exhibits distinguished within- and between-country effects, yet one combines these two types of effect into a single one. Bartels (2015) proposes a simple modeling framework for analyzing clustered data. Particularly, Bartels (2015)'s approach allows us to estimate separate within- and between-country effects, and thus, more explicit substantive interpretations of effects. Furthermore, this method allows for the inclusion of country-level covariates and estimation of a random intercept model allows controlling for unobserved heterogeneity at the country level.

To understand the *cluster confounding* issue, let us assume a linear modeling framework as follows:

$$Distance\_Adverse_{i,j} = \beta_{0,j} + \beta_1 FV\_Margin_{i,j} + \beta_2 X_{i,j} + e_{i,j} \qquad \text{[Firm-Level Equation]} \quad (3a)$$

$$\beta_{0,j} = \gamma_{0,0} + \gamma_{0,1} Z_j + u_{0,j} \qquad \text{[Country-Level Equation]} \quad (3b)$$

Substituting equation 3b into equation 3a, we have a reduced form representation:

$$Distance\_Adverse_{i,j} = \gamma_{0,0} + \beta_1 FV\_Margin_{i,j} + \beta_2 X_{i,j} + \gamma_{0,1} Z_j + u_{0,j} + e_{i,j} \qquad (4)$$

In this setup, i denotes banks and j denotes countries. $X_{i,j}$ is a vector of bank-level covariates and Z_j is a vector of country-level covariates. $e_{i,j}$ represents the bank-specific error, a random term assumed to be normally distributed with mean zero and an estimable variance. $u_{0,j}$ represents unobserved heterogeneity across country.

A standard fixed effects approach allows for each country-level unit a fixed intercept, assuming that $u_{0,j}$ is fixed. Thus, the effects of $FV\_Margin_{i,j}$ and $X_{i,j}$ are solely within-country effects and the effect of Z_j cannot be estimated, eliminating the ability to test between-country hypotheses.

Bartels (2015) proposes a simple modeling approach by including the within- and

[7] See Figure 2.4.

between-country transformations of the bank-level covariates into equation 4 as follows:

$$\begin{aligned} Distance\_Adverse_{i,j} = \gamma_{0,0} + \beta_1 FV\_Margin^W_{i,j} + \beta_2 X^W_{i,j} + \gamma_{0,1} Z_j \\ + \gamma_1 \overline{FV\_Margin}_j + \gamma_2 \overline{X}_j + u_{0,j} + e_{i,j} \end{aligned} \tag{5}$$

The between-cluster operationalization of $FV\_Margin_{i,j}$ is $\overline{FV\_Margin}_j$ (the country-specific mean of $FV\_Margin_{i,j}$). The within-cluster operationalization of $FV\_Margin_{i,j}$ is $FV\_Margin^W_{i,j} = FV\_Margin_{i,j} - \overline{FV\_Margin}_j$. β_1 and γ_1 now capture within- and between-country effects of $FV\_Margin_{i,j}$, respectively. Because the proposed approach accounts for country-level heterogeneity and separates within- from between-country variation in bank-level covariates, threats to the accuracy of standard errors should be minimal.

We estimate this linear random intercept model by maximum likelihood (ML).[8] X includes bank-level characteristics: Net_Income, $CapitalR1$, and $Size$. Z includes country-level covariates: Δune_rt, GRP_GR,HPI. We provide detailed definitions of all variables in Table 2.2. The coefficients of interest are β_1 and γ_1 in equation 5 that measure the within- and between-country association of FV_Margin and $Distance\_Adverse$, respectively. We expect they are significantly positive.

Credit Loss Prediction Test

We further conduct horse race tests in which we compare the ability of the loan component of our measure (*FV_Margin_Loans*) and stress test results (*Distance_Adverse_tloans*) in explaining next year's realized credit losses. We use NCOs as a proxy for credit losses in our main analysis. NCOs represent the derecognition the amount of loans which are deemed as uncollected, net of any recoveries. NCOs have been used as a measure of credit risk in prior literature (Cantrell et al., 2014, Harris et al., 2018) and in recent analyses of top-down stress tests (Hirtle et al., 2016). NCOs are considered relatively nondiscretionary (Liu and Ryan, 2006, Ryan and Keeley, 2012). The reason is that in the US, bank regulatory guidance requires credit card and other open-end consumer loans to be charged off no later than 180 days past due and closed-end consumer (e.g., auto) loans to be charged off no later than 120 days past due (Harris et al., 2018, Liu and Ryan, 2006).[9] However, in

[8] It is available in both Stata (the "xt" commands) and R (the "nlme" or "lme4" packages).

[9] Though, some discretion remains as Ryan and Keeley (2012) highlight that the number-of-days past due at which heterogeneous loans must be charged off is not specified by the guidance.

Europe, there are no regulatory policies on loan charge-offs at the European level and the ECB has observed varying charge-offs practices by banks (ECB, 2017a). Although IFRS 7 *Financial Instruments: Disclosure* does require banks to disclose their write-off policies, there is heterogeneity in the disclosed details of the write-off criteria.[10] [11]

Another measure of credit losses is largely used is non-performing loans (NPLs) (Harris et al., 2018, Nichols et al., 2009).[12] We do not consider NPLs because the ECB issued the implementing technical standards (ITS) on forbearance and non-performing exposures on 21 October 2013. Its definition of NPEs is applicable to all participating banks and came into force in September 2014 with first reporting on 31 December 2014. Furthermore, subsequent to the 2014 Comprehensive Assessment (comprising an asset quality review and a stress test), the ECB expressed its expectation that banks reflect the AQR adjustments (i.e. additional provisions for credit losses) in their financial reports.[13] The ECB also intensifies it supervision on NPLs (including identification, measurement, and management NPLs) by mandating a high-level team (comprising staff from the ECB and national competent authorities) to develop a consistent supervisory approach to NPLs in July 2015 (ECB, 2017a). The first outcome is the ECB's Guidance to banks on NPLs published on 20 March 2017.

We estimate the following regressions using the same as the method in the stress test prediction analysis:

$$NCO_{i,2014} = \beta_0 + \beta_1 FV\_Margin\_Loans_{i,2013} + \beta Controls_{i,2013} + \epsilon_i \tag{6a}$$

$$NCO_{i,2014} = \beta_0 + \beta_1 Distance\_Adverse\_tloans_{i,2013} + \beta Controls_{i,2013} + \epsilon_i \tag{6b}$$

If *FV_Margin_Loans* and *Distance_Adverse* help to predict credit losses, we expect them to be negatively associated with future NCOs because lowering the margin implies larger credit impairments and higher future defaults. We then use seemingly unrelated regressions

[10] IFRS 7 comes into effective for annual reports beginning on or after 1 January 2007.

[11] See Figure 2.4 for illustration of banks' disclosure.

[12] NPLs are also considered relatively nondiscretionary. However, bank managers can exercise two forms of discretion over them. First, they can make new loans to non-performing borrowers to enable them to make payments on their existing loans and keep them 'performing'. Second, they can choose to charge off nonperforming loans (Harris et al., 2018, Nichols et al., 2009).

[13] See Figure 2.5

(SUR) to test the difference between the two coefficients in predicting one-year-ahead NCOs.

Bank-level controls include Net_Income_NCO (earnings before NCO), $\Delta tnetloans$, $CapitalR1$, and $Size$. Country-level characteristics are Δune_rt, GRP_GR, and HPI. Definitions of all variables are provided in Table 2.2.

2.5. Results

2.5.1. Summary Statistics

Table 2.3 contains descriptive statistics for variables used in our stress test prediction tests. To reduce the influence of outliers, all variables are winsorized at the extreme 1% of their distribution. We also report descriptives for other variables to highlight important features of our sample. The average (median) bank size is approximately €274 (100) billion. *pct_loan* indicates that net loans (gross loans less loan loss reserves) amount to 65.1 percent of total assets on average in our sample while *pct_trading* reveals trading assets account for 7.6 percent of total assets on average in our sample.

Turning to the variables in our main tests, FV_Margin is about 50.6 percent of the book value of equity on average, while $Distance\_Adverse$ is about 20.4 percent of the book value of equity. 18.8 percent of the sampled banks fail the hurdle rate for the adverse scenario in the 2014 EU-wide stress test and 56 participating banks are public traded.

Table 2.4 presents pairwise correlations correlation coefficients (Pearson below diagonal, Spearman above diagonal) between the variables in our main tests. Our measure FV_Margin is positively correlated with $Distance\_Adverse$ (the Pearson and Spearman correlation coefficients are 0.32 ($p < 0.05$) and 0.37 ($p < 0.01$), respectively). On a univariate basis, NCO_{14} is highly more correlated with FV_Margin_Loans ($r_{Pearson}$=-0.31, $p_{Pearson} < 0.05$; $r_{Spearman}$=-0.23, $p_{Spearman} < 0.05$) than $Distance\_Adverse\_tloans$ ($r_{Pearson}$=-0.04, $p_{Pearson} > 0.10$; $r_{Spearman}$=-0.03, $p_{Spearman} > 0.10$). Thus, the disaggregated loan margin appears to be more strongly related to one-year-ahead realized credit losses than stress test outcome on a univariate basis.

2.5.2. Stress Test Prediction Results

Figure 2.3 plots the within- and between-country association between our measure and stress test results. Graphically, there is no evidence of differences between the within- and between-country effects.

The results of estimating equation 3 are reported in Table 2.5. Columns 1-3 report the estimate for the full sample, columns 4-6 for private-held subsample, and columns 7-9 for public-listed subsample. Within-Country and Between-Country columns report the coefficients of within-country and between-country covariates, respectively. Abs(Within-Between) columns report statistical tests for cluster confounding, that is, whether the differences between the within- and between-country effects are statistically significant.

Consistent with our expectation, the within-country coefficient on FV_Margin in column 1 is positive and statistically significant (coefficient = 0.122, p-value < 0.01). The between-country association shows expected sign though insignificant (coefficient = 0.096, p-value > 0.10). The test of cluster confounding is consistent with the graphical evidence and suggests that the difference between these two effects is statistically insignificant. Thus, the positive association between fair value margin and stress test results can be viewed as a pooled estimate, with the within- and between-country effects being equal.

We also perform a cross-sectional test by splitting our sample based on the bank's ownership structure. The reason behind this partition is to address the measurement concern in the estimation of financial assets' values. Nichols et al. (2009) argue that public-traded banks have more demand for verifiability than privately held banks due to the increased separation of ownership and control well as market discipline. Indeed, Cantrell et al. (2014) provide evidence that the lower predictive ability of loan fair values relative to net historical costs is due to insufficient scrutiny.[14] Results in columns 3-6 reveal that the positive within-country association of our measure and stress test results is concentrated in the public listed banks. For public listed banks, within-country effect of fair value margin is positive and statistically significant (coefficient = 0.297, p-value < 0.01), while between-country effect is

[14]Specifically, banks provide relatively better fair value quality when they are subjected to higher scrutiny (measured as proportion of financial experts on the audit committee, big N auditors, and residual financial analyst following).

statistically significant public listed banks (coefficient = 0.147, p-value < 0.01). There is only marginal evidence of cluster confounding.

2.5.3. Credit Loss Prediction Results

We next disaggregate our fair value margin measure to loan element, which is expected to predict the performance of one-year-ahead realized credit losses. Table 2.6 reports "horse race" tests of the prediction of realized credit loss between loan element of fair value margin and stress test outcomes as specified in Equation 6a and Equation 6b, respectively. Results in columns 1-6 reveal that the within-country association between loan element of fair value margin and NCO_{14} is significantly negative (coefficient = -0.036, p-value < 0.01) whereas that between stress test results and NCO_{14} is negative but insignificant (coefficient = -0.004, p-value > 0.10). The between-country associations in both cases are negative but insignificant.

Columns 7-11 present the test of the difference between coefficients between two metrics in predicting NCO_{14} using either ML (column 7-9) or SUR (column 10-11). While the within-country association between loan element of fair value margin and NCO_{14} remains statistically significant, tests of linear combination of coefficients reveal that the within- and between- country predictive ability of two metrics are not significantly different.

To further understand the predictive ability of the proposed metric, we perform a cross-sectional test by including a cross-sectional variable $Fail$, which is equal to 1 if the bank fail the stress test. The intuition behind this test is whether loan element of fair value margin perform better in identifying problematic banks (proxied as one-year-ahead realized credit losses) than the stress test results.

Table 2.7 reports the results of this cross-sectional test. Consistent with our expectation, columns 1-6 reveal that the within-country negative association between loan element of fair value margin and NCO_{14} is significant and concentrated in the passed banks (coefficient = -0.047, p-value < 0.01). Tests of linear combination of coefficients reveal that the FV_Margin performs better in predicting NCO_{14} for passed banks (coefficient = -0.052, p-value = 0.072 (SUR)), $Distance\_Adverse\_tloans$ performs better in predicting for failed banks (coefficient = -0.190, p-value = 0.017 (SUR)). Below, we provide evidence that this

better performance may due to the effect of corrective actions for failed banks by CAs following the stress testing.

2.5.4. Gains and Losses on Disposal or Repurchase of Loans Results

In this section, we examine the potential impact of corrective actions taken by the CAs following the stress test. In particular, if the CAs are more likely to force failed banks to clean up NPLs from their balance sheets, they are less likely to charge off their NPLs. Ideally, we would examine the association between failed banks and their NPLs disposal activities. However, data on the amount and types of disposed loans are not available. We recognize that the credit quality of loans is negatively associated with the income on disposal of loans. Thus, we hypothesize that failed banks, which are more likely to subject to corrective actions by the CAs recognize more losses on loan disposal following the stress test. To perform the analysis, we form a subsample of 58 banks that report the gains (losses) on disposal or repurchase of loans (and receivables) line item.

Results of the test are reported in Table 2.8. Column 1-3 report the association between $Fail$ and $Net\_Income\_Loan\_Disposal_{14}$ with macro-economic variables while column 4-6 report the results including bank-level covariates. Column 7-9 report the cross-sectional test with the interaction term between $Fail$ and $Distance\_Adverse\_tloans$ to examine the marginal effect of the stress test results. While the coefficients on $Fail$ are negative, it is only significant in column 7 (coefficient = -0.437, p-value = 0.015) meaning that within a country, failed banks are less likely to gain on loan disposals one year after the stress test. Furthermore, the coefficient on the interaction term in column 7 is significantly negative revealing the marginal negative effect of the stress test results for the failed banks.

2.6. Conclusion

In this paper, we propose a financial statement based measure of a bank's resilience. In particular, the difference between fair values of assets and book value of liabilities reflects the bank's ability to settle the worst-case scenario, in which the bank is subjected to run on its liability side. We first show that our measure is significantly and positively associated with EU-wide stress test results. We then compare the predictive power of the loan component of

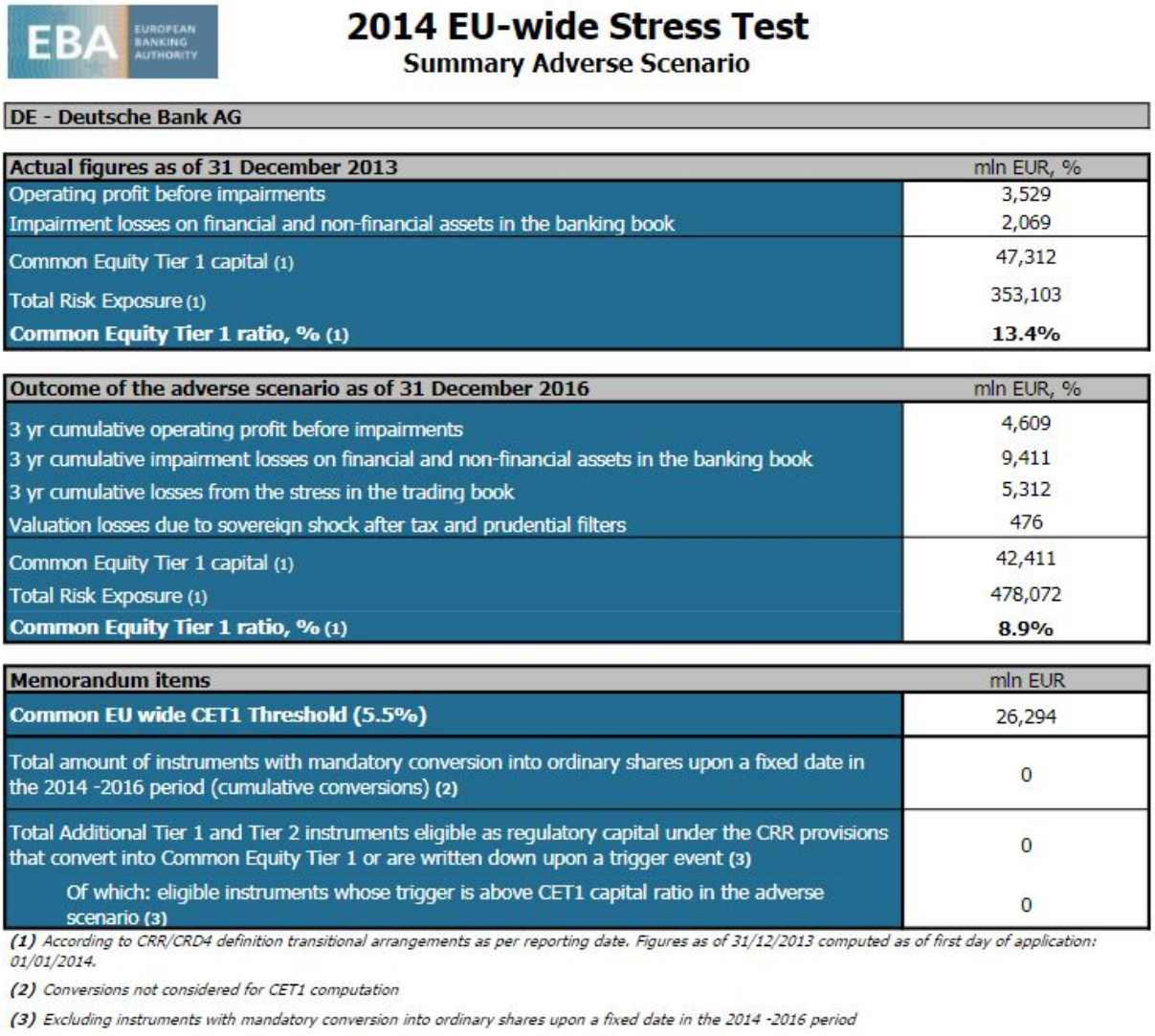
our measure with the stress test results for on-year-ahead realized credit losses. The results show that two measures perform equally for the pooled sample. Further test reveals that the predictive ability of our measure is better in the passed bank subsample while that of stress test outcome is better for the failed bank subsample. The latter result may attribute to a potential limitation of the test, that is future realized credit losses may be a by-product of regulatory intervention or corrective actions by the CAs following the stress test (i.e. cleaning up the balance sheets by selling NPLs).

Figures and Tables

Figure 2.1

Stress Test Result Disclosure Example - Deutsche Bank

This figure displays the excerpts of the disclosure of Deutsche Bank AG's 2014 stress test results.



2014 EU-wide Stress Test
Summary Adverse Scenario

DE - Deutsche Bank AG

Actual figures as of 31 December 2013	mln EUR, %
Operating profit before impairments	3,529
Impairment losses on financial and non-financial assets in the banking book	2,069
Common Equity Tier 1 capital (1)	47,312
Total Risk Exposure (1)	353,103
Common Equity Tier 1 ratio, % (1)	**13.4%**

Outcome of the adverse scenario as of 31 December 2016	mln EUR, %
3 yr cumulative operating profit before impairments	4,609
3 yr cumulative impairment losses on financial and non-financial assets in the banking book	9,411
3 yr cumulative losses from the stress in the trading book	5,312
Valuation losses due to sovereign shock after tax and prudential filters	476
Common Equity Tier 1 capital (1)	42,411
Total Risk Exposure (1)	478,072
Common Equity Tier 1 ratio, % (1)	**8.9%**

Memorandum items	mln EUR
Common EU wide CET1 Threshold (5.5%)	26,294
Total amount of instruments with mandatory conversion into ordinary shares upon a fixed date in the 2014 -2016 period (cumulative conversions) (2)	0
Total Additional Tier 1 and Tier 2 instruments eligible as regulatory capital under the CRR provisions that convert into Common Equity Tier 1 or are written down upon a trigger event (3)	0
Of which: eligible instruments whose trigger is above CET1 capital ratio in the adverse scenario (3)	0

(1) According to CRR/CRD4 definition transitional arrangements as per reporting date. Figures as of 31/12/2013 computed as of first day of application: 01/01/2014.

(2) Conversions not considered for CET1 computation

(3) Excluding instruments with mandatory conversion into ordinary shares upon a fixed date in the 2014 -2016 period

Figure 2.2

Summary of 2014 EU-wide Stress Test

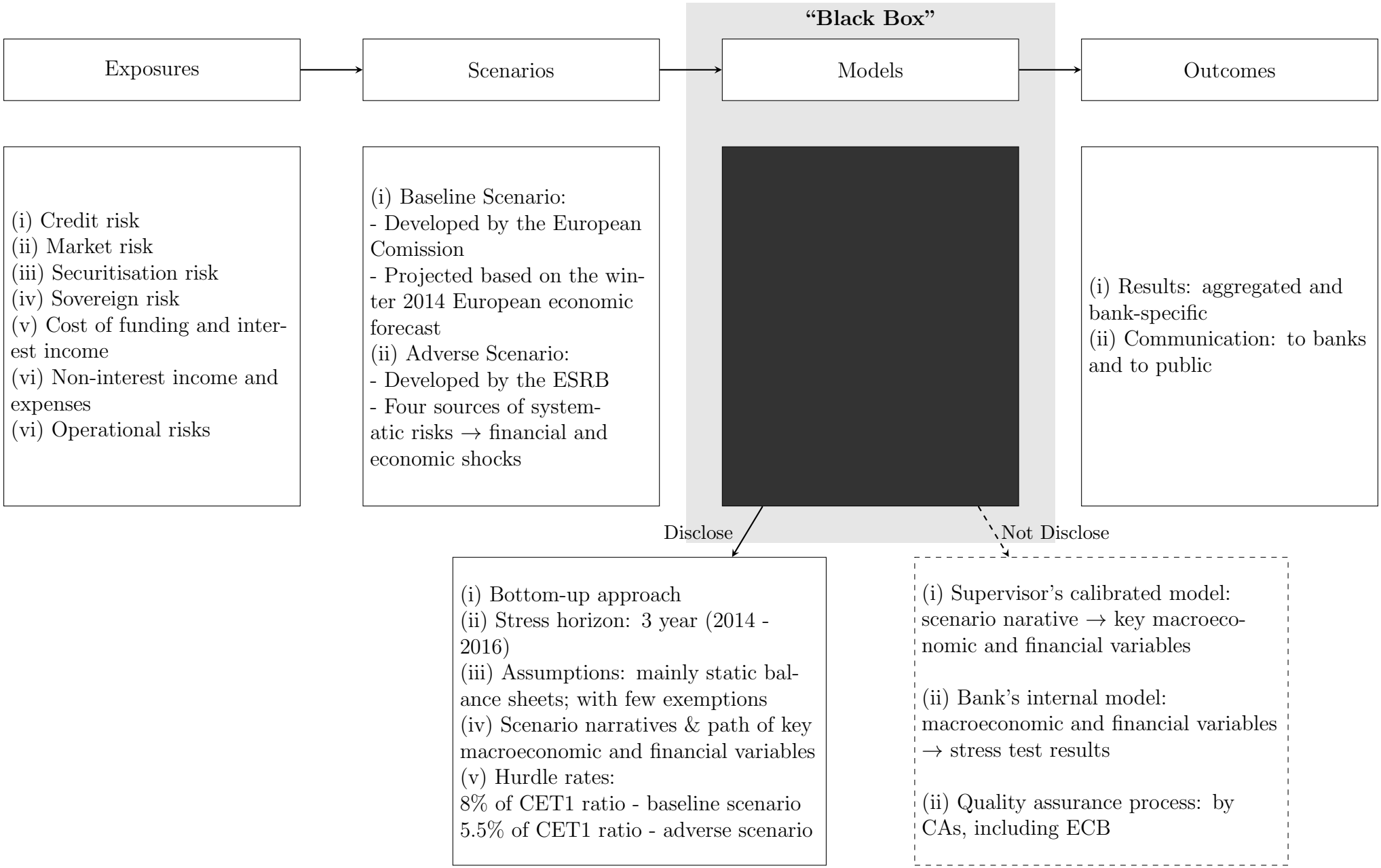


Figure 2.3

Within-Country and Between-Country Effect

This figure displays the within-country, between-country, and total association between FV_Margin and stress test results.

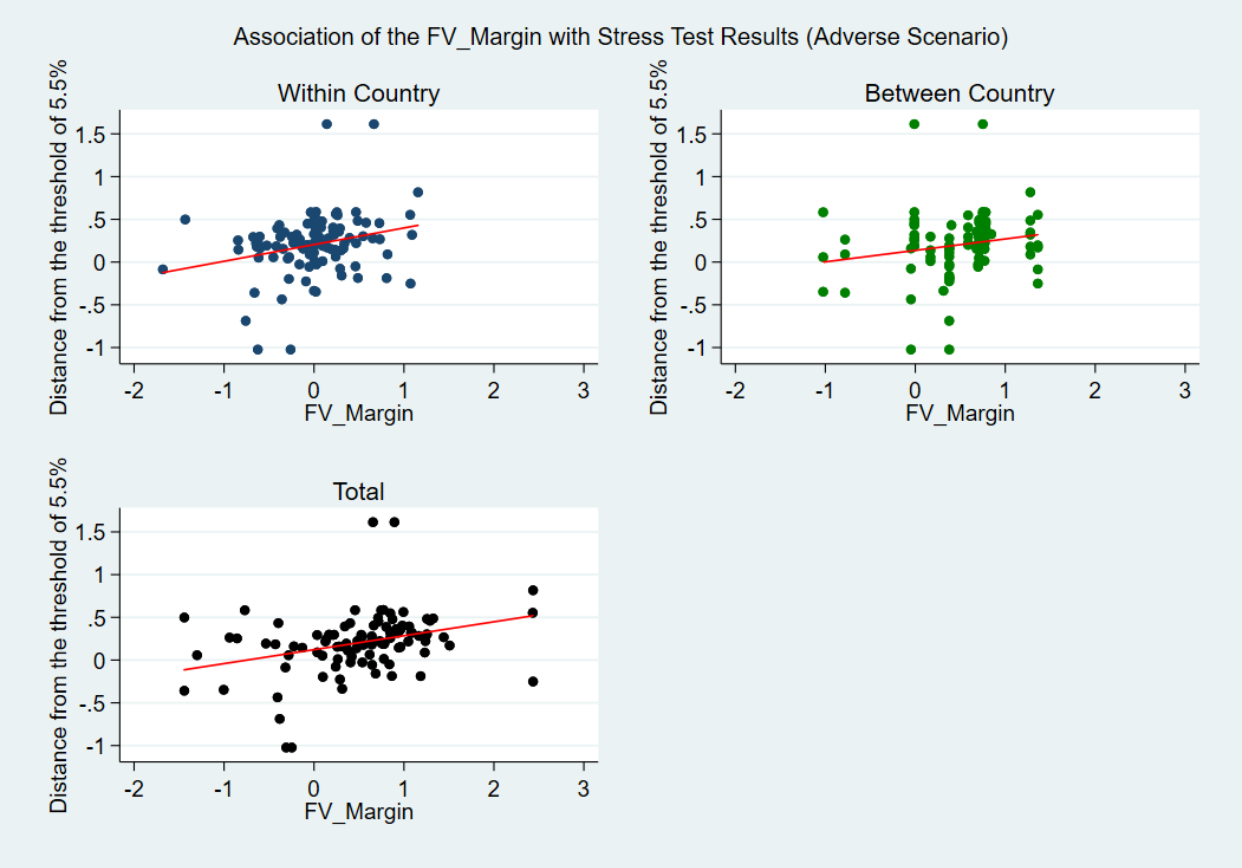


Figure 2.4

Illustration of Disclosure of Charge-Off Policy

This figure displays the excerpts of the disclosure of charge-off policy by three banks in the sample.

Deutsche Bank 2014

When it is considered that there is no realistic prospect of recovery and all collateral has been realized or transferred to the Group, the loan and any associated allowance is charged off (the loan and the related allowance are removed from the balance sheet). Individually significant loans where specific loan loss provisions are in place are evaluated at least quarterly on a case-by-case basis. For this category of loans, the number of days past due is an indicator for a charge-off but is not a determining factor. A charge-off will only take place after considering all relevant information, such as the occurrence of a significant change in the borrower's financial position such that the borrower can no longer pay the obligation, or the proceeds from the collateral are insufficient to completely satisfy the current carrying amount of the loan.

For collectively assessed loans, which are primarily mortgages and consumer finance loans, the timing of a charge-off depends on whether there is any underlying collateral and the Group's estimate of the amount collectible. For mortgage loans, the portion of the loan which is uncollateralized is charged off when the mortgage becomes 840 days past due, at the latest. For consumer finance loans, any portion of the balance which the Bank does not expect to collect is written off at 180 days past due for credit card receivables, and 270 days past due for other consumer finance loans.

Subsequent recoveries, if any, are credited to the allowance account and are recorded in the Consolidated Statement of Income as a component of the provision for credit losses.

UniCredit SpA 2014

Derecognition of a loan or receivable in its entirety (write-off) is made when the legal rights on the loan have failed or the loan or receivable is deemed to be irrecoverable or is written off. Write-offs are recognized directly in profit or loss under item 130(a) "Net losses/recoveries on impairment (a) loans and receivables" and reduce the amount of the principal of the loan or receivable. Reversals of all or part of amounts previously written off are recognized in the same item.

HSBC 2014

Write-off of loans and advances

Loans (and the related impairment allowance accounts) are normally written off, either partially or in full, when there is no realistic prospect of recovery. Where loans are secured, this is generally after receipt of any proceeds from the realisation of security. In circumstances where the net realisable value of any collateral has been determined and there is no reasonable expectation of further recovery, write-off may be earlier.

Reversals of impairment

If the amount of an impairment loss decreases in a subsequent period, and the decrease can be related objectively to an event occurring after the impairment was recognised, the excess is written back by reducing the loan impairment allowance account accordingly. The write-back is recognised in the income statement.

Figure 2.5

ECB Expectation after the Comprehensive Assessment

This figure displays the excerpts of the statement of the ECB expectation after the Comprehensive Assessment in the Aggregate Report on the Comprehendive Assessment (Source: ECB (2014)).

The AQR respected current accounting and prudential regulation, including the CRR/CRD IV capital rules.[4] In some areas the ECB's methodology involved additional prudential prescription to accounting concepts in order to achieve consistency and adequate conservatism. The results are of a prudential nature. AQR-adjustments were made, often in cases where banks were not breaching accounting rules. However, it is expected that many banks will likely choose to reflect many of these changes in their accounts. Examples of areas in which additional prescription was provided include impairment triggers, the calculation of individual specific provisions, and collateral valuations.

Table 2.1

Panel A: Sample Construction	
	Number of Banks
Banks participated in the Stress Test	123
Less: banks whose 2013 financial reports could not be retrieved	6
Less: banks that did not disclose fair value of assets on notes to financial statement	15
Less: banks with missing financial data	1
Total Sample	101
Panel B: Sample Composition	
Country	Number of Banks
Austria	5
Belgium	5
Cyprus	1
Denmark	4
France	10
Germany	12
Greece	4
Hungary	1
Ireland	3
Italy	15
Latvia	1
Malta	1
Netherlands	6
Norway	1
Poland	6
Portugal	3
Slovenia	3
Spain	12
Sweden	4
United Kingdom	4

Table 2.2

Variable Definitions

Variable	Definition
EBA Stress Test Results	
Distance_Adverse	$\frac{\text{CET1 capital (under the adverse scenario)}-5.5\%*\text{RWA under the adverse scenario}}{\text{Book value of Equity}_{2013}}$
Distance_Adverse_tloans	$\frac{\text{CET1 capital (under the adverse scenario)}-5.5\%*\text{RWA under the adverse scenario}}{\text{Total net loans to customers}_{2013}}$
Fail	Dummy variable equals to 1 if the bank failed the stress test under the adverse scenario; 0 otherwises
Accounting Data	
FV_Margin	$\frac{\text{Fair value of disclosed assets}_{2013}+\text{Historical cost of equity instruments}_{2013}-\text{Book value of liabilities}_{2013}}{\text{Book value of Equity}_{2013}}$
FV_Margin_Loans	$\frac{\text{Fair value of net loans}_{2013}-\text{Historical cost of net loans}_{2013}}{\text{Total net loans to customers}_{2013}}$
Net_Income	$\frac{\text{Net Income}_{2013}}{\text{Book value of Equity}_{2013}}$
Net_Income_NCO	$\frac{\text{Net Income}_{2013}+\text{NCO}_{2013}}{\text{Total net loans to customers}_{2013}}$
NCO_{14}	$\frac{\text{Net Charge-offs}_{2014}}{\text{Total net loans to customers}_{2013}}$,missing NCO is filled in as follows: $NCO_{t+1} = ALL_t - ALL_{t+1} + LLP_{t+1}$
avNCO_{14-15}	$\frac{\text{Average of Net Charge-offs}_{2014-2015}}{\text{Total net loans to customers}_{2013}}$, missing NCO is filled in as follows: $NCO_{t+1} = ALL_t - ALL_{t+1} + LLP_{t+1}$
avNCO_{14-16}	$\frac{\text{Average of Net Charge-offs}_{2014-2016}}{\text{Total net loans to customers}_{2013}}$, missing NCO is filled in as follows: $NCO_{t+1} = ALL_t - ALL_{t+1} + LLP_{t+1}$
$Net\_Income\_Loan\_Disposal_{14}$	Gains (losses) on disposal or repurchase of loans (and receivables) in 2014
CapitalR1	Capital Tier 1 Ratio in 2013
Size	Natural logarithm of total assets in 2013

(continued on next page)

Table 2.2 ***(continued)***

Variable Definitions	
Variable	Definition
Δtnetloans	Change in total loans in 2013 divided by total loans in 2012
Public	Dummy variable equals to 1 if the bank is publicly listed; 0 otherwises
Market Data	
σ_{ret}	Standard deviation of daily return in 2013
Macroeconomics Data	
Δune_rt	Annual percentage change in unemployment rate (*Source: Eurostat*)
GDP_GR	Annual real GDP growth rate (percentage change on previous year) (*Source: Eurostat*)
HPI	Annual average of change in house price index (*Source: Eurostat*)

Table 2.3

Descriptive Statistics								
	N	Mean	SD	P1	P25	P50	P75	P99
Distance_Adverse	101	0.204	0.363	-1.023	0.064	0.218	0.363	1.614
FV_Margin	101	0.506	0.710	-1.442	0.212	0.642	0.894	2.436
Distance_Adverse_tloans	101	0.031	0.057	-0.074	0.005	0.025	0.039	0.283
FV_Margin_Loans	101	0.010	0.051	-0.174	-0.005	0.009	0.039	0.119
Fail	101	0.188	0.393	0.000	0.000	0.000	0.000	1.000
NCO_{14}	100	0.007	0.007	0.000	0.002	0.005	0.011	0.031
$avNCO_{14-15}$	100	0.008	0.009	0.000	0.003	0.005	0.012	0.049
$avNCO_{14-16}$	99	0.009	0.012	0.000	0.003	0.006	0.012	0.084
Net_Income	101	-0.013	0.238	-1.135	0.005	0.043	0.081	0.298
Net_Income_NCO	100	0.006	0.036	-0.191	0.003	0.009	0.015	0.093
CapitalR1	101	13.071	3.614	7.128	10.641	12.499	14.727	24.337
Size	101	11.529	1.482	8.255	10.527	11.419	12.523	14.409
Public	101	0.554	0.500	0.000	0.000	1.000	1.000	1.000
Δtnetloans	101	-0.023	0.116	-0.256	-0.082	-0.047	0.006	0.398
σ_{ret}	56	0.031	0.033	0.011	0.016	0.021	0.027	0.209
$Net\_Income\_Loan\_Disposal_{14}$	58	5.07	23.98	-48.06	-1.46	0.00	4.84	86.00
Total_Assets	101	273,941	423,441	3,845	37,307	90,992	274,646	1,810,522
pct_loans	101	0.651	0.143	0.253	0.571	0.663	0.752	0.932
pct_trading	101	0.076	0.107	0.000	0.004	0.029	0.098	0.445

This table presents the summary statistics of our final sample in the stress test analysis. Data on stress test results are obtained from EBA website. Balance sheet data are collected from financial reports and SNL Financial. Market data are form Thomson Reuters. Definitions of all variables are available in Table 2.2.

Table 2.4

Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	FV_Margin		0.62***	0.37***	0.26**	-0.20	-0.18	-0.19	0.23*	0.12	0.24*	-0.18	-0.32**	-0.22*	0.28**
(2)	FV_Margin_Loans	0.62***		0.19	0.11	-0.23*	-0.24*	-0.23*	0.03	-0.05	-0.09	0.05	-0.24*	-0.04	0.14
(3)	Distance_Adverse	0.32**	0.12		0.85***	-0.24*	-0.24*	-0.33**	0.51***	0.43***	0.43***	0.02	-0.08	-0.68***	0.26**
(4)	Distance_Adverse _tloans	0.20*	0.16	0.76***		-0.03	-0.05	-0.15	0.56***	0.66***	0.32**	-0.04	0.03	-0.68***	0.20
(5)	NCO_{14}	-0.14	-0.31**	-0.13	-0.04		0.90***	0.81***	-0.26**	0.16	-0.08	-0.12	0.09	0.03	-0.24*
(6)	$avNCO_{14-15}$	-0.10	-0.30**	-0.11	0.02	0.90***		0.94***	-0.28**	0.14	-0.14	-0.16	0.14	0.02	-0.25*
(7)	$avNCO_{14-16}$	-0.11	-0.34***	-0.16	-0.03	0.79***	0.93***		-0.32**	0.05	-0.23*	-0.21*	0.13	0.14	-0.25*
(8)	Net_Income	0.15	0.07	0.43***	0.32***	-0.23*	-0.30**	-0.37***		0.79***	0.22*	0.05	0.04	-0.45***	0.50***
(9)	Net_Income_NCO	0.06	0.03	0.32**	0.44***	-0.13	-0.21*	-0.29**	0.88***		0.18	-0.01	0.09	-0.48***	0.28**
(10)	CapitalR1	0.20*	-0.04	0.36***	0.31**	-0.09	-0.07	-0.04	0.04	0.06		0.06	-0.04	-0.24*	-0.02
(11)	Size	-0.18	0.06	0.02	-0.15	-0.21*	-0.25*	-0.25*	0.17	0.11	0.00		0.16	-0.25*	-0.16
(12)	Public	-0.28**	-0.14	-0.18	-0.15	0.04	-0.01	-0.06	0.01	0.02	-0.10	0.16		0.13	-0.08
(13)	Fail	-0.19	-0.04	-0.68***	-0.48***	0.09	0.08	0.16	-0.49***	-0.44***	-0.20*	-0.23*	0.13		-0.13
(14)	Δtnetloans	0.18	0.16	0.30**	0.27**	-0.21*	-0.24*	-0.27**	0.46***	0.37***	0.03	-0.10	-0.07	-0.13	

This table reports pairwise correlation coefficients (Pearson below diagonal, Spearman above diagonal). Data on stress test results are obtained from EBA website. Balance sheet data are collected from financial reports and SNL Financial. Market data are form Thomson Reuters. Definitions of all other variables are available in Table 2.2. *, **, and *** denote significance at a two-sided 10%, 5%, and 1% level, respectively.

Table 2.5

Stress Test Prediction Results

	Distance_Adverse											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Within-Country	Between-Country	Abs(Within-Between)	Within-Country	Between-Country	Abs(Within-Between)	Within-Country	Between-Country	Abs(Within-Between)	Within-Country	Between-Country	Abs(Within-Between)
FV_Margin	0.122**	0.096	-0.027	0.038	-0.008	-0.046	0.297***	0.147***	-0.149*	0.232***	0.151***	-0.081
	[2.292]	[1.036]	[-0.251]	[0.460]	[-0.058]	[-0.291]	[4.228]	[2.894]	[-1.695]	[2.914]	[3.030]	[-0.842]
Net_Income	0.644***	0.317	-0.327	0.248	0.272	0.024	0.838***	0.210	-0.629**	0.853***	0.160	-0.692**
	[4.385]	[1.244]	[-1.114]	[0.899]	[0.646]	[0.051]	[5.358]	[1.047]	[-2.184]	[5.456]	[0.797]	[-2.373]
CapitalR1	0.022**	0.020	-0.002	0.007	0.038	0.031	0.038***	0.021	-0.017	0.042***	0.035**	-0.006
	[2.429]	[0.898]	[-0.077]	[0.526]	[0.891]	[0.696]	[3.066]	[1.644]	[-0.895]	[3.288]	[2.171]	[-0.299]
Size	-0.007	0.016	0.023	-0.109*	0.027	0.136	0.098***	-0.023	-0.121***	0.089***	-0.023	-0.112***
	[-0.257]	[0.424]	[0.495]	[-1.781]	[0.317]	[1.335]	[3.724]	[-1.099]	[-3.390]	[3.399]	[-1.084]	[-3.153]
σ_{ret}										-0.967	-2.274	-1.306
										[-1.018]	[-1.442]	[-0.743]
Δune_rt		-0.080			-0.566			-0.422			-0.333	
		[-0.113]			[-0.599]			[-0.840]			[-0.675]	
GDP_GR		0.060			0.073			0.048*			0.039	
		[1.235]			[0.706]			[1.670]			[1.341]	
HPI		0.004			-0.009			0.011			0.006	
		[0.285]			[-0.442]			[1.314]			[0.676]	
Constant	-0.284			-0.543			0.138			0.001		
	[-0.627]			[-0.636]			[0.431]			[0.003]		
Sample		Full sample			Private-held subsample			Public-listed subsample			Public-listed subsample	
Observations		101			45			56			56	
Number of Country		20			13			17			17	

This table presents estimates of the stress test prediction analysis as in equation 5. The dependent variable, *Distance_Adverse*, is measured as the difference between CET1 capital and 5.5% (the hurdle rate to pass the stress test) multiply with RWA (results under the adverse scenario) scaled by base year book value of equity. *FV_Margin* is the sum of fair value of disclosed assets and book value of equity investment minus book value of liabilities scaled by base year book value of equity. All control variables are defined in Table 2.2. Z-statistics are reported in square brackets below each point estimate. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 2.6

Credit Loss Prediction Results (I)

	NCO_{14}										
	(1) Within-Country (ML)	(2) Between-Country (ML)	(3) Abs(Within-Between) (ML)	(4) Within-Country (ML)	(5) Between-Country (ML)	(6) Abs(Within-Between) (ML)	(7) Within-Country (ML)	(8) Between-Country (ML)	(9) Abs(Within-Between) (ML)	(10) Within-Country (SUR)	(11) Between-Country (SUR)
FV_Margin_Loans	-0.036**	-0.021	0.015				-0.037**	-0.021	0.016	-0.037**	-0.027
	[-2.215]	[-1.050]	[0.588]				[-2.220]	[-0.880]	[0.534]	[-2.44]	[-0.96]
Distance_Adverse_tloans				-0.004	-0.025	-0.021	0.004	0.001	-0.004	0.004	0.007
				[-0.176]	[-0.571]	[-0.445]	[0.227]	[0.016]	[-0.066]	[0.25]	[0.13]
Net_income_NCO	-0.013	0.019	0.031	-0.012	0.014	0.026	-0.018	0.019	0.036	-0.018	0.004
	[-0.601]	[0.428]	[0.647]	[-0.401]	[0.300]	[0.473]	[-0.583]	[0.415]	[0.669]	[-0.48]	[0.08]
Δtnetloans	-0.004	-0.031*	-0.027	-0.006	-0.031	-0.025	-0.004	-0.031*	-0.026	-0.004	-0.027
	[-0.716]	[-1.727]	[-1.433]	[-1.023]	[-1.642]	[-1.264]	[-0.749]	[-1.673]	[-1.374]	[-0.71]	[-1.64]
CapitalR1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.338]	[0.275]	[0.119]	[0.573]	[0.323]	[0.050]	[0.220]	[0.271]	[0.153]	[0.25]	[0.43]
Size	0.001	-0.002***	-0.003***	0.001	-0.002***	-0.003***	0.001	-0.002***	-0.003***	0.001	-0.002**
	[1.400]	[-3.115]	[-3.330]	[1.493]	[-3.275]	[-3.519]	[1.386]	[-2.879]	[-3.154]	[1.43]	[-2.10]
Δune_rt		-0.027**			-0.032**			-0.027**			-0.026***
		[-2.135]			[-2.473]			[-1.963]			[-2.70]
GDP_GR		-0.001			-0.000			-0.001			-0.001
		[-0.555]			[-0.344]			[-0.497]			[-0.49]
HPI		-0.000			-0.000			-0.000			-0.000
		[-0.951]			[-0.802]			[-0.946]			[-1.61]
Constant	0.032***			0.035***			0.032***			0.029**	
	[3.806]			[3.888]			[3.344]			[2.40]	
FV_Margin_Loans - Distance_Adverse_tloans							-0.041	-0.022		-0.041	-0.034
							(0.140)	(0.745)		(0.108)	(0.647)
Observations		99			99			99			99
Number of Country		20			20			20			20

This table presents estimates of the credit loss prediction analysis as in equation 6a and equation 6b. The dependent variable, NCO_{14}, is defined as net charge-off in 2014 scaled by base year book value of equity. *FV_Margin_Loans* is the difference between fair value of loans and book value of loans scaled by base year total net loans. *Distance_Adverse_tloans*, is measured as the difference between CET1 capital and 5.5% (the hurdle rate to pass the stress test) multiply with RWA (results under the adverse scenario) scaled by base year total net loans. All control variables are defined in Table 2.2. Z-statistics are reported in square brackets below each point estimate. p-values are reported in brackets below linear combination of coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 2.7

Credit Loss Prediction Results (II)

	NCO_{14}										
	(1) Within-Country (ML)	(2) Between-Country (ML)	(3) Abs(Within-Between) (ML)	(4) Within-Country (ML)	(5) Between-Country (ML)	(6) Abs(Within-Between) (ML)	(7) Within-Country (ML)	(8) Between-Country (ML)	(9) Abs(Within-Between) (ML)	(10) Within-Country (SUR)	(11) Between-Country (SUR)
FV_Margin_Loans	-0.047***	-0.005	0.042				-0.039**	-0.002	0.037	-0.039**	-0.001
	[-2.766]	[-0.150]	[1.079]				[-2.380]	[-0.048]	[0.940]	[-2.07]	[-0.02]
FV_Margin_Loans * Fail	0.057**	-0.018	-0.075				0.061**	-0.068	-0.129	0.061*	-0.104
	[2.121]	[-0.191]	[-0.753]				[2.456]	[-0.553]	[-1.033]	[1.96]	[-1.16]
Distance_Adverse_tloans				0.003	0.067	0.064	0.013	0.090	0.076	0.013	0.041
				[0.159]	[0.852]	[0.792]	[0.732]	[1.119]	[0.929]	[0.81]	[0.49]
Distance_Adverse_tloans				0.212***	-0.107	-0.320	0.199***	0.059	-0.140	0.199***	-0.031
* Fail				[3.414]	[-0.332]	[-0.971]	[3.301]	[0.155]	[-0.365]	[2.72]	[-0.11]
Fail	0.000	0.006	0.006	0.002	0.010	0.007	0.004*	0.016	0.012	0.004	0.004
	[0.035]	[0.897]	[0.844]	[1.095]	[0.839]	[0.616]	[1.720]	[1.103]	[0.834]	[1.30]	[0.37]
Net_Income_NCO	-0.016	0.045	0.061	-0.042	0.097	0.139*	-0.047*	0.105	0.151*	-0.047	0.036
	[-0.706]	[0.866]	[1.073]	[-1.416]	[1.331]	[1.764]	[-1.660]	[1.443]	[1.946]	[-1.43]	[0.48]
Δtnetloans	-0.003	-0.033*	-0.029	-0.011**	-0.049*	-0.038	-0.009*	-0.040	-0.031	-0.009**	-0.032*
	[-0.642]	[-1.783]	[-1.531]	[-2.003]	[-1.807]	[-1.372]	[-1.702]	[-1.399]	[-1.065]	[-1.99]	[-1.65]
CapitalR1	0.000	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	[0.567]	[0.237]	[0.022]	[-0.003]	[0.288]	[0.268]	[-0.087]	[-0.137]	[-0.104]	[-0.09]	[-0.43]
Size	0.001	-0.002**	-0.003***	0.000	-0.001	-0.002	0.001	-0.001	-0.002	0.001	-0.001
	[1.476]	[-2.480]	[-2.882]	[0.943]	[-1.308]	[-1.589]	[1.066]	[-0.829]	[-1.176]	[1.09]	[-1.18]
Δune_rt		-0.026*			-0.021			-0.014			-0.016
		[-1.906]			[-1.312]			[-0.776]			[-1.21]
GDP_GR		0.000			-0.000			0.000			-0.000
		[0.033]			[-0.031]			[0.065]			[-0.06]
HPI		-0.000			-0.000			-0.000			-0.000
		[-0.912]			[-0.934]			[-1.074]			[-1.54]
Constant	0.028***			0.017			0.013			0.025	
	[2.753]			[1.037]			[0.833]			[1.29]	
FV_Margin_Loans -							-0.053*	-0.091		-0.053*	-0.042
Distance_Adverse_tloans							(0.053)	(0.296)		(0.072)	(0.645)
FV_Margin_Loans + FV_Margin_Loans * Fail							-0.190***	-0.218		-0.190**	-0.115
- Distance_Adverse_tloans - Distance_Adverse_tloans * Fail							(0.004)	(0.623)		(0.017)	(0.718)
Observations		99			99			99		99	
Number of Country		20			20			20		20	

This table presents estimates of the credit loss prediction analysis in equation 6a and equation 6b. The dependent variable, NCO_{14}, is defined as net charge-off in 2014 scaled by base year book value of equity. *FV_Margin_Loans* is the difference between fair value of loans and book value of loans scaled by base year total net loans. *Distance_Adverse_tloans*, is measured as the difference between CET1 capital and 5.5% (the hurdle rate to pass the stress test) multiply with RWA (results under the adverse scenario) scaled by base year total net loans. *Fail*, an indicator variable equals to 1 if the bank failed the stress test under the adverse scenario; 0 otherwises. All control variables are defined in Table 2.2. Z-statistics are reported in square brackets below each point estimate. p-values are reported in brackets below linear combination of coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 2.8

Gains (losses) on disposals of loans and receivables prediction results

	$Net\_Income\_Loan\_Disposal_{14}$								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Within-Country (ML)	Between-Country (ML)	Abs(Within-Between) (ML)	Within-Country (ML)	Between-Country (ML)	Abs(Within-Between) (ML)	Within-Country (ML)	Between-Country (ML)	Abs(Within-Between) (ML)
Fail	-0.150	-0.244	-0.094	-0.155	-0.250	-0.095	-0.437**	-0.286	0.150
	[-1.092]	[-1.536]	[-0.449]	[-1.088]	[-1.394]	[-0.413]	[-2.416]	[-1.054]	[0.461]
Fail * Distance_Adverse_tloans							-8.719*	-4.879	3.841
							[-1.721]	[-0.623]	[0.412]
Distance_Adverse_tloans							-1.938	1.718	3.655
							[-1.329]	[0.403]	[0.811]
CapitalR1				-0.006	0.020	0.026	0.007	0.016	0.010
				[-0.309]	[0.747]	[0.788]	[0.351]	[0.624]	[0.302]
Size				-0.000	-0.064	-0.063	0.000	-0.028	-0.028
				[-0.008]	[-0.832]	[-0.675]	[0.006]	[-0.275]	[-0.247]
Δune_rt		-0.525			-1.187			-0.939	
		[-0.819]			[-1.167]			[-0.895]	
GDP_GR		-0.018			-0.097			-0.078	
		[-0.358]			[-0.949]			[-0.742]	
HPI		-0.005			0.002			0.000	
		[-0.335]			[0.146]			[0.023]	
Constant	0.071			0.569			0.139		
	[1.052]			[0.750]			[0.117]		
Observations		58			58			58	
Number of Country		15			15			15	

This table presents estimates of the net income on disposal or repurchases of loans prediction analysis. The dependent variable, $Net\_Income\_Loan\_Disposal_{14}$, is measured as gains (losses) on disposal or repurchase of loans (and receivables) in 2014 scaled by base year net income. *Fail* is an indicator variable equals to 1 if the bank failed the stress test under the adverse scenario; 0 otherwises. *Distance_Adverse_tloans*, is measured as the difference between CET1 capital and 5.5% (the hurdle rate to pass the stress test) multiply with RWA (results under the adverse scenario) scaled by base year total net loans. All control variables are defined in Table 2.2. Z-statistics are reported in square brackets below each point estimate. p-values are reported in brackets below linear combination of coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Appendix

Table A2.1

Scenario Paths				
Panel A: Baseline Scenario				
		2014	2015	2016
Real GDP Growth	Euro area	1.2	1.8	1.7
	EU	1.5	2.0	1.8
Unemployment Rate	Euro area	12.0	11.7	11.3
	EU	10.7	10.4	10.1
Price Inflation	Euro area	1.0	1.25	1.5
	EU	1.2	1.45	1.7
Residential Property Prices	Euro area	-0.2	2.1	3.8
	EU	0.9	2.7	3.8
Commercial Property Prices	Euro area	1.0	2.5	3.6
	EU	1.5	2.8	3.4
Panel B: Adverse Scenario				
		2014	2015	2016
Real GDP Growth	Euro area	-0.7	-1.4	0.0
	EU	-0.7	-1.5	0.1
Unemployment Rate	Euro area	12.3	12.9	13.5
	EU	11.3	12.3	13.0
Price Inflation	Euro area	1.0	0.6	0.3
	EU	1.1	0.6	0.0
Residential Property Prices	Euro area	-8.0	-5.7	-1.5
	EU	-7.9	-6.2	-2.1
Commercial Property Prices	Euro area	-2.4	-2.5	-0.6
	EU	-3.6	-3.7	-1.2

Source: ESRB (2014)

Table A2.2

Sample Banks

Bank Name	Country Code
Erste Group Bank AG	AT
Raiffeisen Zentralbank Österreich AG	AT
Raiffeisenlandesbank Oberösterreich AG	AT
BAWAG P.S.K.	AT
Raiffeisenlandesbank Niederösterreich-Wien AG	AT
Investar (Holding of Argenta Bank-en Verzekeringsgroep)	BE
AXA Bank Europe SA	BE
KBC Group NV	BE
Belfius Banque SA	BE
Dexia NV	BE
Bank of Cyprus Public Company Ltd	CY
DekaBank Deutsche Girozentrale	DE
Commerzbank AG	DE
Landesbank Baden-Württemberg	DE
Norddeutsche Landesbank-Girozentrale	DE
Bayerische Landesbank	DE
Landwirtschaftliche Rentenbank	DE
Deutsche Bank AG	DE
DZ Bank AG Deutsche Zentral Genossenschaftsbank	DE
Aareal Bank AG	DE
Volkswagen Financial Services AG	DE
Landesbank Hessen-Thüringen Girozentrale	DE
HSH Nordbank AG	DE
Sydbank	DK
Nykredit	DK
Jyske Bank	DK
Danske Bank	DK

Continued on next page

Table A2.2 *(continued)*

Bank Name	Country Code
Banco de Sabadell, S.A. (Sabadell)	ES
Caja de Ahorros y Pensiones de Barcelona (La Caixa)	ES
Cajas Rurales Unidas, Sociedad Cooperativa de Crédito	ES
Caja de Ahorros y M.P. de Zaragoza, Aragón y Rioja (Ibercaja)	ES
Banco Financiero y de Ahorros, S.A. (BFA/Bankia)	ES
Banco Santander, S.A. (Santander)	ES
Bankinter, S.A.	ES
Banco Bilbao Vizcaya Argentaria, S.A. (BBVA)	ES
NCG Banco, S.A.	ES
Liberbank, S.A.	ES
Banco Popular Español, S.A.	ES
Kutxabank, S.A.	ES
Groupe Crédit Mutuel	FR
BNP Paribas	FR
Société de Financement Local	FR
Banque PSA Finance	FR
BPI France (Banque Publique d'Investissement)	FR
Groupe Crédit Agricole	FR
RCI Banque	FR
Groupe BPCE	FR
La Banque Postale	FR
Société Générale	FR
Eurobank Ergasias, S.A.	GR
Alpha Bank, S.A.	GR
National Bank of Greece, S.A.	GR
Piraeus Bank, S.A.	GR
HU - OTP Bank Ltd	HU
Allied Irish Banks plc	IE
Permanent tsb plc.	IE

Continued on next page

Table A2.2 ***(continued)***

Bank Name	Country Code
The Governor and Company of the Bank of Ireland	IE
Banca Popolare di Sondrio S.C.P.A.	IT
Banca Piccolo Credito Valtellinese S.C.P.A.	IT
Mediobanca - Banca di Credito Finanziario S.p.A.	IT
Banca Popolare di Vicenza - S.C.P.A.	IT
Iccrea Holding S.p.A	IT
Banca Popolare Dell'Emilia Romagna S.C.P.A.	IT
Banca Carige S.P.A. - Cassa di Risparmio di Genova e Imperia	IT
Banca Monte dei Paschi di Siena S.p.A.	IT
Credito Emiliano S.p.A.	IT
Intesa Sanpaolo S.p.A.	IT
UniCredit S.p.A.	IT
Veneto Banca S.C.P.A.	IT
Banca Popolare Di Milano S.C.P.A.	IT
Banco Popolare S.C.P.A.	IT
Unione Di Banche Italiane S.C.P.A.	IT
ABLV Bank, AS	LV
Bank of Valletta plc	MT
ABN AMRO Bank N.V.	NL
Coöperatieve Centrale Raiffeisen-Boerenleenbank B.A.	NL
SNS Bank N.V.	NL
Nederlandse Waterschapsbank N.V.	NL
Bank Nederlandse Gemeenten N.V.	NL
ING Bank N.V.	NL
DNB Bank ASA	NO
Bank BPH SA	PL
Alior Bank SA	PL
Bank Handlowy W Warszawie SA	PL
Bank Ochrony Srodowiska SA	PL

Continued on next page

Table A2.2 ***(continued)***

Bank Name	**Country Code**
Getin Noble Bank SA	PL
Powszechna Kasa Oszczednosci Bank Polski S.A.	PL
Banco BPI, SA	PT
Caixa Geral de Depósitos, SA	PT
Banco Comercial Português, SA	PT
Skandinaviska Enskilda Banken AB (publ) (SEB)	SE
Swedbank AB (publ)	SE
Svenska Handelsbanken AB (publ)	SE
Nordea Bank AB (publ)	SE
Slovenska izvozna in razvojna banka	SI
Nova Ljubljanska banka d. d., Ljubljana	SI
Nova Kreditna Banka Maribor d.d.	SI
HSBC Holdings plc	UK
Royal Bank of Scotland Group plc	UK
Lloyds Banking Group plc	UK
Barclays plc	UK

References

Acharya, V. V., T. Eisert, C. Eufinger, and C. Hirsch (2018). Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans. *Review Of Financial Studies 31*(8), 2857–2896.

Acharya, V. V., R. Engle, and D. Pierret (2014). Testing macroprudential stress tests: The risk of regulatory risk weights. *Journal of Monetary Economics 65*, 36–53.

Acharya, V. V., I. Gujral, N. Kulkarni, and H. S. Shin (2011). Dividends and Bank Capital in the Financial Crisis of 2007-2009. *NBER Working Paper*, 1–43.

Acharya, V. V., H. T. Le, and H. S. Shin (2016). Bank Capital and Dividend Externalities. *Review Of Financial Studies*.

Acharya, V. V. and S. G. Ryan (2016). Banks' Financial Reporting and Financial System Stability. *Journal of Accounting Research 54*(2), 277–340.

Admati, A. R., P. M. DeMarzo, M. F. Hellwig, and P. Pfleidere (2014). Fallacies and Irrelevant Facts in the Discussion on Capital Regulation. *Central Banking at a Crossroads*, 33–51.

Asea, P. K. and B. Blomberg (1998). Lending cycles. *Journal of Econometrics 83*(1-2), 89–128.

Bai, J., A. Krishnamurthy, and C. H. Weymuller (2018). Measuring Liquidity Mismatch in the Banking Sector. *Journal of Finance 73*(1), 51–93.

Baker, M., B. Mendel, and J. Wurgler (2016). Dividends as reference points: A behavioral signaling approach. *Review of Financial Studies 29*(3), 697–738.

Bartels, B. L. (2015). Beyond "Fixed Versus Random Effects": A Framework For Improving Substantive And Statistical Analysis Of Panel, Time-Series Cross-Sectional, And Multilevel Data. *Working Paper*, 1–43.

Baudino, P., R. Goetschmann, J. Henry, K. Taniguchi, and W. Zhu (2018). FSI Insights on policy implementation Stress-testing banks – a comparative analysis. *BIS Working Papers* (November), 1–36.

BCBS (2017). Supervisory and bank stress testing: range of practices. *BIS Working Papers* (December), 1–66.

Beatty, A. and S. Liao (2011). Do delays in expected loss recognition affect banks' willingness to lend? *Journal of Accounting and Economics 52*(1), 1–20.

Berger, A. N. and C. H. Bouwman (2009). Bank liquidity creation. *Review of Financial Studies 22*(9), 3779–3837.

Berger, A. N. and G. F. Udell (2004). The institutional memory hypothesis and the procyclicality of bank lending behavior. *Journal of Financial Intermediation 13*(4), 458–495.

Bhat, G., S. G. Ryan, and D. Vyas (2018). The Implications of Banks' Credit Risk Modeling Disclosures for Their Loan Loss Provision Timeliness and Loan Origination Procyclicality. *Management Science*, 1–26.

Bikker, J. A. and P. A. Metzemakers (2005). Bank provisioning behaviour and procyclicality. *Journal of International Financial Markets, Institutions and Money 15*(2), 141–157.

Blankespoor, E., T. J. Linsmeier, K. R. Petroni, and C. Shakespeare (2013). Fair value accounting for financial instruments: Does it improve the association between bank leverage and credit risk? *Accounting Review 88*(4), 1143–1177.

Boldin, R. and K. Leggett (1995). Bank dividend policy as a signal of bank quality. *Financial Services Review 4*(1), 1–8.

Brunnermeier, M. K., G. Gorton, and A. Krishnamurthy (2012). Risk Topography. *NBER Working Paper 26*(August), 149–176.

Brunnermeier, M. K. and L. H. Pedersen (2009). Market liquidity and funding liquidity. *Review of Financial Studies 22*(6), 2201–2238.

Bushman, R. M. and C. D. Williams (2012). Accounting discretion, loan loss provisioning, and discipline of Banks' risk-taking. *Journal of Accounting and Economics 54*(1), 1–18.

Bushman, R. M. and C. D. Williams (2015). Delayed Expected Loss Recognition and the Risk Profile of Banks. *Journal of Accounting Research 53*(3), 511–553.

Cameron, A. C., J. B. Gelbach, and D. L. Miller (2008). Bootstrap-Based Improvements for Inference with Clustered Errors. *The Review of Economics and Statistics 90*(3), 414–427.

Cantrell, B. W., J. M. McInnis, and C. G. Yust (2014). Predicting credit losses: Loan fair values versus historical costs. *Accounting Review 89*(1), 147–176.

Chae, S., R. Sarama, C. M. Vojtech, and J. Wang (2018). The Impact of the Current Expected Credit Loss Standard (CECL) on the Timing and Comparability of Reserves. *Working Paper*, 1–28.

Diamond, D. W. and P. H. Dybvig (1983). Bank Runs , Deposit Insurance , and Liquidity. *Journal of Political Economy 91*(3), 401–419.

Domikowsky, C., D. Foos, and M. Pramor (2015). Loan Loss Accounting Rules and Bank Lending over the Cycle : Evidence from a Global Sample. *Working Paper*, 1–49.

Dugan, J. C. (2009). Loan loss provisioning and pro-cyclicality. *Remarks before the Institute of International Bankers March*, 1–10.

EBA (2014). Results of 2014 EU-wide stress test: Aggregate results. *European Banking Authority* (October), 1–51.

ECB (2014). *Aggregate Report on the Comprehensive Assessment*. Number October.

ECB (2015a). Recommendations European Central Bank of 17 December 2015 on dividend distribution policies. *Official Journal of the European Union*, 1–3.

ECB (2015b). Recommendations European Central Bank of 28 January 2015 on dividend distribution policies. *Official Journal of the European Union*, 1–3.

ECB (2016). Recommendation of the European Central Bank of 13 December 2016 on dividend distribution policies. *Official Journal of the European Union*, 1–4.

ECB (2017a). Guidance to banks on non-performing loan. *European Central Bank*, 1–131.

ECB (2017b). Recommendation of the European Central Bank of 28 December 2017 on dividend distribution policies. *Official Journal of the European Union*, 1–3.

ESRB (2014). EBA/SSM stress test: The macroeconomic adverse scenario. *European Banking Authority* (April), 1–17.

Evans, M. E., L. D. Hodder, and P. E. Hopkins (2014). The Predictive Ability of Fair Values for Future Financial Performance of Commercial Banks and the Relation of Predictive Ability to Banks' Share Prices. *Contemporary Accounting Research 31*(1), 13–44.

FASB (2006). Fair Value Measurements Statement of Financial Accounting Standards No. 157. *Norwalk, CT: FASB*, 1–91.

Fethi, M. D. and F. Pasiouras (2010). Assessing bank efficiency and performance with operational research and artificial intelligence techniques: A survey. *European Journal of Operational Research 204*(2), 189–198.

Financial Stability Forum (2009). Report of the Financial Stability Forum on Addressing Procyclicality in the Financial System. *Financial Stability Forum*, 1–29.

Fiordelisi, F., O. Ricci, and F. S. S. Lopes (2017). The unintended consequences of the launch of the single supervisory mechanism in Europe. *Journal of Financial and Quantitative Analysis 52*(6), 2809–2836.

Floyd, E., N. Li, and D. J. Skinner (2015). Payout policy through the financial crisis: The growth of repurchases and the resilience of dividends. *Journal of Financial Economics 118*(2), 299–316.

Gambacorta, L. and P. E. Mistrulli (2004). Does bank capital affect lending behavior? *Journal of Financial Intermediation 13*(4), 436–457.

Gambacorta, L. and H. S. Shin (2018). Why bank capital matters for monetary policy. *Journal of Financial Intermediation 35*(B), 17–29.

Granja, J. and C. Leuz (2017). The Death of a Regulator: Strict Supervision, Bank Lending and Business Activity. *Working Paper*, 1–58.

Gropp, R., T. Mosk, S. Ongena, and C. Wix (2019). Banks response to higher capital requirements: Evidence from a quasi-natural experiment. *Review of Financial Studies 32*(1), 266–299.

Harris, T. S., U. Khan, and D. Nissim (2018). The expected rate of credit losses on banks' loan portfolios. *Accounting Review 93*(5), 245–271.

Hirtle, B., A. Kovner, J. Vickery, and M. Bhanot (2016). Assessing financial stability: The Capital and Loss Assessment under Stress Scenarios (CLASS) model. *Journal of Banking and Finance 69*, S35–S55.

Hirtle, B. and A. Lehnert (2015). Supervisory Stress Tests. *Annual Review of Financial Economics 7*(1), 339–355.

Hodder, L., P. Hopkins, and K. Schipper (2014). Fair value measurement in financial reporting. *Foundations and Trends in Accounting 8*(3-4), 143–270.

IASB (2011). *IFRS 13 Fair Value Measurement*. Number May.

Ivashina, V. and D. Scharfstein (2010). Bank lending during the financial crisis of 2008. *Journal of Financial Economics 97*(3), 319–338.

Iyengar, G., Y. Luo, S. Rajgopal, V. Venkatasubramanian, and Z. Zhang (2017). Towards a Financial Statement Based Approach to Modeling Systemic Risk in Insurance and Banking. *Working Paper*, 1–70.

Jayaraman, S., B. Schonberger, and J. S. Wu (2017). Good Buffer, Bad Buffer. *Working Paper*, 1–68.

Kolari, J., F. J. López-Iturriaga, and I. P. Sanz (2019). Predicting European bank stress tests: Survival of the fittest. *Global Finance Journal 39*, 44–57.

Leisenring, J., T. Linsmeier, K. Schipper, and E. Trott (2012). Business-model (intent)-based accounting. *Accounting and Business Research 42*(3), 329–344.

Liu, C.-C. and S. G. Ryan (2006). Income smoothing over the business cycle: Changes in banks' coordinated management of provisions for loan losses and loan charge-offs from the pre-1990 bust to the 1990s boom. *Accounting Review 81*(2), 421–441.

Myers, S. C. and N. S. Majluf (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics 13*(2), 187–221.

Nichols, D. C., J. M. Wahlen, and M. M. Wieland (2009). Publicly traded versus privately held: Implications for conditional conservatism in bank accounting. *Review of Accounting Studies 14*(1), 88–122.

Nicoletti, A. (2018). The Effects of Bank Regulators and External Auditors on Loan Loss Provisions. *Journal of Accounting and Economics*, 1–22.

Ogura, Y. (2006). Learning from a rival bank and lending boom. *Journal of Financial Intermediation 15*(4), 535–555.

Penman, S. H. (2007). Financial reporting quality: is fair value a plus or a minus? *Accounting and Business Research 37*(Supp.1), 33–44.

Rajan, R. G. (1994). Why Bank Credit Policies Fluctuate : A Theory and Some Evidence. *Quarterly Journal of Economics 109*(2), 399–441.

Ronen, J. (2008). To Fair Value or Not to Fair Value : A Broader Perspective. *Abacus 44*(2), 181–208.

Roodman, D., J. G. MacKinnon, M. Ø. Nielsen, and M. D. Webb (2019). Fast and wild: Bootstrap inference in Stata using boottest. *Stata Journal 19*(1), 4–60.

Ruckes, M. (2004). Bank competition and credit standards. *Review of Financial Studies 17*(4), 1073–1101.

Ryan, S. G. and J. H. Keeley (2012). Discussion of "Did the SEC impact banks' loan loss reserve policies and their informativeness?". *Journal of Accounting and Economics 56*(2-3), 66–78.

Shin, H. S. (2015). On book equity : why it matters for monetary policy. *Speech at "Banking and regulation: the next frontier" workshop 27*(2), 1–7.

Vyas, D. (2011). The Timeliness of Accounting Write-Downs by U.S. Financial Institutions During the Financial Crisis of 2007-2008. *Journal of Accounting Research 49*(3), 823–860.