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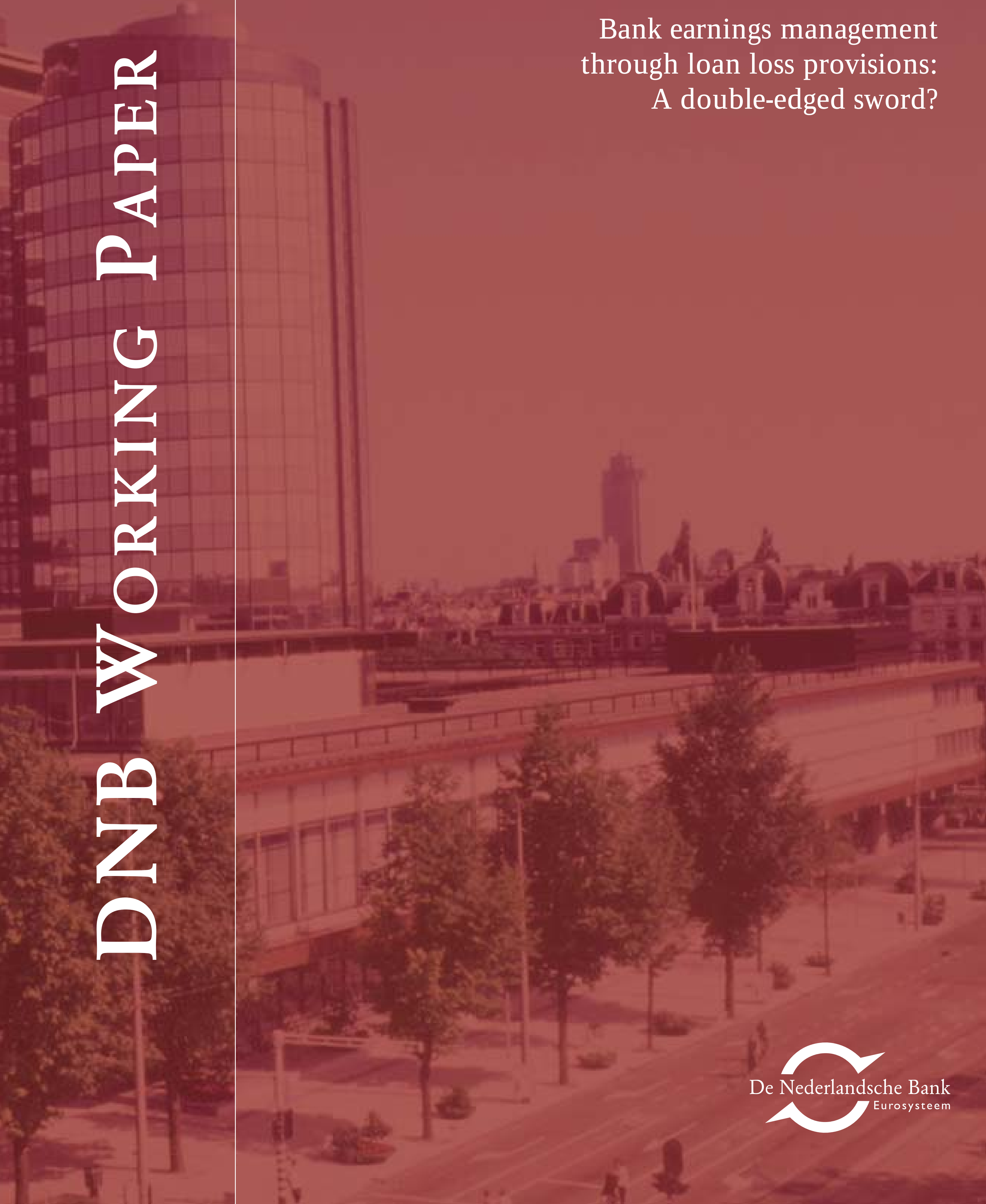

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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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Bank earnings management through loan loss provisions: A double-edged sword?

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Abstract

We investigate whether banks use of loan loss provisions (LLPs) to manage the level and volatility of their earnings and examine the implications for bank risk. We find that banks use LLPs to manage the level and volatility of earnings downward when they are abnormally high and when expected dividends are lower than current earnings. Moreover, banks adjust LLPs to avoid fluctuations in their risk-weighted assets. Our findings highlight an important trade-off in the provisioning for expected and unexpected losses that affects bank risk and profitability.

Keywords: Loan loss provisions; Bank risk; Earnings smoothing; Discretion; Payout policy

JEL classification: G21; G28; G34; M41

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1. Introduction

Similarly to non-financial companies, banks can use accruals to manage their earnings (e.g., Beaver et al., 1989; Moyer, 1990; Scholes et. al. 1990; Wahlen, 1994; Beatty et. al, 1995; Beaver and Engel, 1996; Kim and Kross, 1998; Liu and Ryan, 2006). One of the most important bank accruals, loan loss provisions (LLPs), is calculated based on an incurred loss approach and reflects the expected losses arising from their lending business. Unexpected losses, defined as negative deviations from the expected losses, should be absorbed by bank capital and are calculated through risk weighted assets. From a prudential perspective, there is little research on how the management of earnings through LLPs is associated to the risk profile of a bank. The related capital management hypothesis states that banks adjust the provisioning behavior to manage the capital ratios (e.g., Kim and Kross, 1998; Beatty et. al, 1995; Collins et. al., 1995). The evidence from the literature is not conclusive and could be advanced by jointly considering the interaction between LLPs and changes of risk weighted assets. In this paper, we take a new perspective that combines the bank earnings *and* risk management considerations. We investigate how banks use LLPs to manage the level and volatility of their earnings and examine the implications for risk. Banks' incentives to engage in earnings management with LLPs depend on their business objectives, governance, and performance. Especially the level and volatility of earnings and the need to build up capital reserves through retained earnings play an important role (e.g., Fan and Wong, 2002; Ahmed and Takeda, 1998; Liu, Ryan and Wahlen, 1997). On the one hand, banks might use the LLPs to stabilize earnings levels, to reduce the volatility in earnings, and to implement the desired payout policy. Hence, too high LLPs lower the reported profitability but increase the buffer against expected losses. On the other hand, low LLPs increase the reported profitability but also increase the chance that a bank must use its capital to cover large losses. (e.g., Laeven and Majnoni, 2003). A key feature of LLPs, unlike accruals of non-financial firms, is that they simultaneously influence bank profitability and bank risk, which results in a trade-off (Bushman and Williams, 2011; Beatty and Liao, 2009).

Our analysis is based on quarterly supervisory data of 85 Dutch banks (out of which 36 national GAAPs) that spans the period from 1998 to 2012. Our data is representative for the Dutch banking sector as it reflects more than 80% of total bank assets. Moreover, in the Netherlands, general LLPs of banks are neither tax-deductible nor recognized as Tier 2 capital.[1] Therefore, the motives for earnings management of Dutch banks through accruals, unlike the motives for other banks, are more strongly related to operational profitability and risk considerations and to a lesser extent by the institutional, legal, and regulatory environment (e.g., minimizing the tax burden).

In the first step of our analysis, we estimate panel data regression models for discretionary earnings before LLPs and changes in discretionary asset risk. We then use the output of these two models to test whether banks create higher LLPs when discretionary earnings are high and when discretionary bank unexpected risks are low. In the second step, we examine the volatility of banks' earnings before and after loan loss provisioning in a rolling window analysis. This approach makes it possible for us to test whether LLPs are used to reduce earnings volatility. In the third step, we estimate a standard model of dividend targets and investigate whether its output is influenced by banks' changes in earnings volatility due to the use of LLPs. This test sheds light on the question whether earnings management directly translates into certain payout policies.

Our study yields three principal results. First, we find that banks create higher LLPs when discretionary earnings are high and lower LLPs when the increase in discretionary risk-weighted assets is high. The first finding is in line with prior literature on the management of discretionary earnings level while the second one is direct evidence on the interplay between

[1] Certain countries have similar tax treatments (France and UK) and/or regulatory rules (Italy) in place, while other countries differ (Germany, Ireland and Luxemburg).

expected losses and unexpected losses. Our results are established with models in which we include the discretionary component of these variables and control for loan growth, bank specialization, and macro-economic conditions. Second, banks use LLPs to moderate the volatility of their earnings and, subsequently, there is a positive effect leading to less volatile risk weighted assets for banks with smoother earnings. A smooth volatility of earnings is a long term implication of the first finding of discretionary earnings management, while the reduced volatility of risk is related to the reduced uncertainty surrounding the financial position of the bank. Third, we find that dividend paying banks have higher discretionary LLPs if their current earnings are lower than prior dividends. This finding is opposed to the upward earnings management behavior of non-financial companies documented by Daniel, Denis and Naveen (2008). Various additional tests confirm that these results are not sensitive to alternative variable definitions, model specifications, institutional characteristics, banking sector structure, and are robust in subsamples.

Our conclusions highlight the risk perspective on the earnings management through LLP literature and bring into light dividend based earnings management. The results provide novel evidence on the capital management hypothesis, by documenting a broader adjustment mechanism between expected and unexpected losses. When changes in risk weighted assets decrease, banks prefer to buffer against losses with provisions as capital is costly (i.e. due to dilution of shareholders' return). Vice versa, when changes in risk weighted assets increase, banks must increase capital due to the regulatory constraint and thus, provisions are not raised. Thus, the allocation of buffers against risk changes as a result of a change in the intrinsic risk portfolio allocation of a bank. Investigating further the behavior of managing earnings through LLPs, the article also provides evidence on dividend based management for banks by documentation an "earnings bath" if banks cannot achieve the expected dividend threshold. The relation of this earnings management through accruals follows a U-shaped curve. The importance of LLPs and their interplay with capital and profitability should be captured better in upcoming regulation by, for example, imposing minimum ratios depending on the bank idiosyncratic risks. These findings could become even more prominent in the light of the upcoming IFRS/IASB model for loan loss provisions that replaces the incurred loss approach with an expected loss approach.

The remainder of this paper is organized as follows. In Section 2 we briefly review the related literature and propose a set of hypotheses. In Section 3 we describe our data. In Section 4 we present the results of our empirical analysis. In Section 5 we report the findings of further empirical checks and tests of robustness. Section 6 concludes.

2. Related literature and hypotheses

Our study extends and complements two strands of the accounting and finance literature: studies on earnings management, and studies on loan loss provisioning of banks, especially on the capital management hypothesis.

First, earnings management can be seen as a signal of high quality to outside investors because it provides useful information for the equity valuation and it indicates stability of the firm's sources of income (Penman and Sougiannis, 1998; Barth, 2001). Such smoothing of the earnings level can be maintained by managing accruals. One of the most important accruals of banks is LLPs, which should cover losses from the lending business. When earnings are unusually high, banks can choose discretionary earnings-reducing LLPs whereas when earnings are unusually low LLPs can be deliberately understated or loan loss allowances can be released to offset operational losses. There are several studies that find conclusive evidence that LLPs are used for managing earnings (Greenawalt and Sinkey, 1988; Wahlen, 1994; Laeven and Majnoni, 2003; Liu and Ryan, 2006). Second, the capital management hypothesis states that higher provisioning when capital is low indicates that the two are substitutable buffers against potential losses (e.g., Kim and Kross, 1998; Ahmed et al., 1999; and Bikker and Metzemakers, 2005). However, some studies (Davis and Zhu, 2009; Craig et al, 2006; Bishop, 1996; Collins et al, 1995) fail to find a link between bank capitalization and loan loss provisioning. This is in line with the pecking order theory suggesting that capital is too costly to be frequently raised in the stock market (Myers and Majluf, 1984). In the case of banks, this implies that LLPs are created to withstand temporary future shocks. This leads to a trade-off between the recognition of expected and unexpected losses, as capital serves as a buffer against unexpected losses (through RWAs) and provisions as a buffer against expected losses. Thus, if the relation between LLPs and the change in RWAs is negative then managers decide to create higher provisions in the period in which risk weights decrease. This would confirm the capital management theory through a different perspective.

We hypothesize that both earnings and risk management considerations, especially the interplay with capital requirements to absorb unexpected losses, affect the loan loss provisioning behavior of banks:

Hypothesis H1: A bank is likely to create higher LLPs when discretionary earnings are high (H1 a) and lower LLPs when there is an increase in discretionary risk-weighted assets (H1 b).

Another dimension of earnings management is volatility. Graham et al. (2005) find in a survey which includes mostly non-financial companies that "an overwhelming 96.9% of the survey respondents indicate that they prefer a smooth earnings path". For the purpose of this study, we define smoothness as management of the volatility of earnings following Dechow et al. (2010). There are a number of studies that investigate the role of accruals in ensuring the volatility smoothness of earnings but they are predominantly focused on non-financial companies (Bowen et. al, 2008; Tucker and Zarowing, 2006; Chaney et al., 1998; McNichols and Wilson, 1988; Moses, 1987; Dharan, 1987; White, 1970; Barefield and Comiskey, 1971).

Studies on earnings smoothing of banks investigate the equity volatility as a proxy of the market reaction (Beaver and Engel, 1996; Ahmed et al., 1999; Kanagaretnam et al., 2003; Bushman and Williams, 2012). However, there are no studies that directly relate the volatility of earnings to banks' loan loss provisioning behavior and there are no studies on the relation between the smoothness of earnings and the volatility of risk weighted assets.

We expect that the consequence of the first hypothesis automatically leads to the long term effects of volatility of earnings stabilization. From a risk perspective, we expect that banks with a more stable risk profile will also have a more smooth income stream due to uncertainty reduction and easiness of forecasting. We hypothesize that banks achieve smoothing in the following ways:

Hypothesis H2: The higher a bank's volatility of earnings before LLPs (H1 a) and the lower the volatility of risk weighted assets (H2 b) the higher the difference in volatility of earnings before after LLPs.

An important piece in the decision making process of earnings management are dividends, for which managers appear to be willing to sell assets, lay off employees, raise external funds, or bypass positive net present value projects before cutting the target (Brav et al. (2005)). Lintner (1956) sets the foundation of the dividend theory with its partial adjustment model in response to unanticipated changes in earnings. Kasanen, Kinnunen and Niskanen (1996) argue that the driving force behind earnings management is the objective to achieve a smooth dividend stream to institutional investors. Daniel, Dennis and Naveen (2008) find that non-financial firms tend to manage earnings upward through accruals when the expected dividend payout is below the target. To our knowledge, there are no studies that directly relate banks' dividends to earnings management through LLPs. We expect that earnings are more likely to be managed downwards when the current earnings are lower than the expected dividends (measured as the previous dividends). This reasoning would be consistent with the "big bath" theory in which companies decrease earnings in the current period through accruals (Walsh et al., 1991; Beattie et al., 1994; Christensen et al., 2008; Riedl and Srinivasan, 2010).

We follow the study of Daniel, Dennis and Naveen (2008) on dividend-based earnings management in non-financial companies and apply their approach to bank accruals. We hypothesize that banks manage their earnings through discretionary loan loss provisions downwards (instead of upwards in the case of non-financial companies):

Hypothesis H3: The higher the expected dividend relative to pre-managed earnings the higher the discretionary loan loss provisions.

3. The data

We analyze non-public supervisory data on 85 individual Dutch banks during the period from 1998 Q2 to 2012 Q1 at a quarterly frequency. Our data comprises all commercial, private, merchant and real estate banks, as well as credit cooperatives, foreign subsidiaries, and branches. Commercial banks account for approximately 80% of the sample.[2] We winsorize all variables at 1% and 99% level.

We use supervisory data for the following reasons. First, the data are comprehensive, complete, and contain bank-specific information that is not available for such long time period and at this level of granularity. In public data sources, the data are pooled from numerous sources in which the definition of loan loss provision differs or it is often used interchangeably with loan loss reserves. Moreover, supervisory data make it possible for us to analyze banks' changes in risk-weighted assets (RWAs) at a quarterly frequency over a relatively long period of time. Second, in the Dutch tax law system general provisions are not tax-deductible as in many other EU countries. Third, general LLPs of Dutch banks are not

[2] The data is downloaded from the Internal Supervisory reports of the Dutch Central Bank: COREP (Common Reporting Framework) and FINREP (Financial Reporting) for the period from 2005 Q1 to 2012 Q1 and 8033 (Profit & Loss Data) and 8015 (Solvency data) for the period from 1998 Q1 to 2004 Q4. In all analyses we control for the bank specialization.

recognized as Tier 2 capital. The last two facts allow us to disentangle the motives for earnings management and study bank loan loss provisioning in a more homogeneous setting than cross-country studies. The sample banks are more likely to manage provisions for intrinsic operational profitability and risk considerations rather than for artificially increasing capital or minimizing the tax burden.

Table 1 provides an overview of the descriptive statistics of the main variables used in our study. LLPs are scaled by total loans with a mean of around 0.027% per bank, which is comparable to previous studies. The variable LLP refers to the sum of general and specific loan loss provisions. The return on assets has a mean of 5.035% before LLPs and 3.269% after LLPs. The change in risk-weighted assets is calculated over four quarters as a bank's actual risk taking manifests itself with a time lag relative to changes in its lending policy. The median for this measure is 0.052. The change in dividends and the standard deviation are relatively small indicating a stable payout policy. The median debt growth is positive at 1.4% indicating that banks continued to leverage up on average during our sample period. The leverage level, defined as total debt over total assets, is at 86%, which is typical for financial institutions.

(Insert Table 1 here)

The yearly growth in GDP exhibits a median of 2% and the yearly average loan growth and bankruptcy exhibit medians of 6.7% and 4.9%, respectively. The capital ratio indicates that the banks are relatively well capitalized with a median Regulatory Capital ratio of around 8% per bank. The median capital buffer above the 8% regulatory minimum total capital ratio is 1% in our sample.

4. Empirical analysis

4.1. Models of discretionary earnings and discretionary asset risk

In order to analyze the management of earnings levels, we follow the related literature and calculate the discretionary part of earnings before LLPs and changes in banks' risk-weighted assets. The discretionary part is estimated by taking the difference between the actual variables and the predicted non-discretionary part of these variables. We use the outputs of these models as basis for our analysis of earnings management with LLPs in the next sections. We apply different techniques to estimate the models: ordinary least squares (OLS) regressions, pooled fixed effects panel data models, and dynamic two-step system general method of moments (GMM) panel estimators, following Blundell and Bond (1998) and Arellano Bond (1991). We calculate robust and heteroskedasticity-consistent standard errors that are clustered at the bank level.

With regard to the earnings before loan loss provisions, we estimate a model following Dechow et al. (2010) and Sloan (1996). It is based on previous earnings, $\Delta\ Dividend_{i\ ,t-1}$, $\Delta\ Debt\ growth_{i,t-1}$, $Leverage_{i,t-1}$ and other information to capture the cyclicality such as $\Delta GDP\ _{t-1}$. The coefficient of lagged ROA before LLP is around 0.5 indicating that earnings are persistent.

(Insert Table 2 here)

Our model for the calculation of changes in discretionary asset risk, measured as the change in credit risk-weighted assets (ΔRWA), is based on different determinants of bank idiosyncratic risk such as the lagged $Average\ loan\ growth_{i,t-1}$, $Size_{i,t-1}$, $LLR\ scaled_{i,t-1}$, $Loan\ to\ Deposits_{i,t-1}$ and other macroeconomic information such as changes in the aggregate bankruptcy rate $\Delta Bankruptcy_{t-1}$ (e.g., Laeven and Majnoni, 2003; Foos, Norden and Weber, 2010).

(Insert Table 3 here)

We predict the non-discretionary part of the variables for earnings management and for changes in asset risk using these two models. After taking the difference between the actual variables and the predicted ones, we use the difference (the non-discretionary components) throughout the following models.

4.2. Management of earnings levels

We examine banks' management of earnings levels through LLPs and the management of the relation between expected and unexpected losses in three steps. First, we examine the histogram of the earnings before and after provisions to identify discontinuities around zero and the median change of RWAs and LLPs across banks. Second, we perform a multivariate analysis of the discretionary part of earnings before LLPs including various controls. Third, we study how the results differ when we split the sample based on banks' earnings level, earnings volatility, bank capital, quarter four vs. quarters one to three, and dividend levels.

Figure 1 shows the distribution of return on assets after loan loss provisions for the banks included in the sample. There is a strand of literature arguing that the disproportionate low frequency around zero profits is an indication of earnings management (Jacob Jorgensen, 2007; Frank and Rego, 2006; Roychowdhury, 2006; Leone and Van Horn, 2005; Phillips et al., 2003, 2004; Beaver et al., 2003b; Beatty et al., 2002; Dichev and Skinner, 2002; Burgstahler and Dichev, 1997). For banks, the clustering around zero indicates that accruals (provisions) are higher when earnings are high and lower when earnings are low. The relative frequencies below zero and the ones above zero are lower than the expected normal distribution with the same standard deviation. This is a first indication that banks manage earnings downwards when they are high and upwards when they are low (as opposed to the upward earnings management documented for non-financial firms by Burgstahler and Dichev (1997)).

(Insert Figure 1 here)

Figure 2 indicates the time series relation of the cross sectional median of the change in risk (RWAs) and LLPs. The evolution of the two variables over time indicates a negative relation. This relation is in line with the empirical literature on the intertemporal link between loan growth and bank risk (e.g., Foos, Norden, Weber, 2010) and confirms a trade-off between expected losses (LLPs) and unexpected losses (RWAs).

(Insert Figure 2 here)

In the multivariate analysis, we use the discretionary earnings before LLPs and discretionary changes in credit risk-weighted assets as main independent variables to explain the loan loss provisions. Our model is specified as follows:

$$\begin{aligned} LLP\ to\ TL_{i,t} = {} & a_{i,t} + \alpha_{i,t-1} * LLP\ to\ TL_{i,t-1} + \beta_{i,t} * Discretionary\ Earnings_{i,t} \\ & + \delta_{i,t} * \Delta Discretionary\ RWA_{i,t} + \gamma_{i,t-1} * \Delta LLR\ to\ TL_{i,t-1} \\ & + \zeta_{i,t-1} * Loan\ Size_{\ i,t-1} + \varepsilon_{i,t} \qquad (1) \end{aligned}$$

As stated in Hypothesis H1, we investigate whether and how LLPs are driven by earnings levels (H1a) and/or changes in risk-weighted assets (H1b). The $Discretionary\ Earnings_{i,t}$ are measured before LLPs and obtained from the model described in Section 4.1. Similarly, the $\Delta Discretionary\ RWA_{i,t}$ is obtained from the model described in Section 4.1. As hypothesized we expect a positive relation between the dependent variable and $Discretionary\ Earnings_{i,t}$ and a negative relation between the dependent variable and the $\Delta Discretionary\ RWA_{i,t}$. Recall that the discretionary part of the earnings and asset risk variables corresponds to the component subject to managerial choice. As controls for the LLPs model, we use $\Delta LLR\ to\ TL_{i,t-1}$ and $Loan\ Size_{i,t-1}$ following Wahlen (1994). Non-performing loans cannot be used as a control for realized bank risk because the time-series data is incomplete. Instead, we use $\Delta Discretionary\ RWA_{i,t}$, which directly measures banks' actual ex ante risk taking.

Table 4 reports the results of the multivariate analysis. We use a dynamic two-step system GMM panel estimator, as proposed by Blundell and Bond (1998) with Windmeijer's (2005) finite sample correction. We estimate the first-differences to solve the estimation problem raised by the potential presence of unobserved individual effects. Furthermore, the model gives consistent estimates under the assumption that the error term is not serially correlated and the explanatory variables are (weakly) exogenous. We calculate robust and heteroskedasticity-consistent standard errors. We assume that the independent variables are (weakly) exogenous. We have performed these regressions for a pooled OLS model, a panel data fixed effects model, and a dynamic GMM proposed by Arellano Bond (1991) all with robust standard errors. We have also estimated the results with the variable "Interest income before Loan Loss Provisions" instead of the "Net Income before Loan Loss Provision" to measure only the earnings stemming from bank lending as we consider only bank risk arising from bank lending. The results are similar to the ones reported in Table 4. As growth and risk are interrelated concepts, we have re-run the analysis with Total Assets Growth as a main control variable in the calculation of $\Delta Discretionary\ RWA_{i,t}$ and the results are virtually the same. Separately, we have re-run controlling for the growth in assets and the conclusions are still valid. More robustness checks will follow in Section 5.

(Insert Table 4 here)

We find that $Discretionary\ Earnings_{i,t}$ before LLPs exhibit a positive coefficient, which is consistent with our hypothesis H1a. A one standard deviation increase in the level of $Discretionary\ Earnings_{i,t}$ before LLPs is on average associated with an increase of 0.7% of scaled LLPs. Furthermore, the coefficient of $\Delta Discretionary\ RWA_{i,t}$ is negative, which is in line with hypothesis H1b. A decrease in $\Delta Discretionary\ RWA_{i,t}$ of one standard deviation is on average associated with a 0.3% increase of the scaled LLPs.

We control for the expected part of LLPs using $\Delta LLR\ to\ TL_{i,t-1}$ and $Loan\ Size_{i,t-1}$. Moreover, note that $LLP\ to\ TL_{i,t}$ is cyclical (Laeven & Majnoni, 2003). We therefore used the macroeconomic variables $\Delta Bankruptcy_{t-1}$ and $\Delta GDP_{\ t-1}$ to predict the non-discretionary part of earnings and risks. Furthermore, we include a full set of interacted bank specialization and year-quarter dummies to control for bank and time specific effects.

In Model 1.4., we include $RWA\ absolute_{i,t-1}$ as an additional control to test whether the general risk appetite of a bank relates to $LLP\ to\ TL_{i,t}$. There is a positive coefficient as banks with higher risk weights will also provision more due to higher expected losses. We also include $Capital\ Buffer_{i,t-1}$ because related studies have shown that banks use LLP to manage their capital ratios (e.g., Moyer, 1990; Scholes et al., 1990). Banks with higher capital buffer are less dependent on retained earnings, as indicated by the estimated coefficient.

We continue the multivariate analysis with sample splits to study whether the findings on hypotheses H1a and H1b hold on various subsamples. The results are reported in Table 5.

(Insert Table 5 here)

Through sample splits of data, we find that the management of $Discretionary\ Earnings_{i,t}$ through LLPs increases with higher earnings levels, while the coefficient for $\Delta Discretionary\ RWA_{i,t}$ becomes more negative. The volatility and quarter splits make no difference for the management of earnings levels. The $\Delta Discretionary\ RWA_{i,t}$ is more pronounced in the 1st, 2nd and 3rd quarters than in the 4th quarter while we find no evidence for significant change in the earnings management throughout the year. Furthermore, the banks with higher capital ratios are managing more the level of earnings, while the more capital constrained banks manage earnings less. For the banks that pay dividends, the coefficient of $\Delta Discretionary\ RWA_{i,t}$ is positive and the smoothing of the earnings' is less strong than for the banks that do pay dividends. Finally, the management of earnings levels is less strong during the financial crisis, while the negative relation between provisions and changes in risk-weighted assets becomes stronger during the financial crisis. Earnings smoothing could be less pronounced during the crisis due to pro-cyclicality (e.g., Bolt et. al, 2012) as the incentives of improving buffers to absorb shocks are more important in the crisis.

4.3. Management of earnings smoothing

We investigate the smoothing of earnings defined as difference between the volatility of earnings before and after LLPs in two steps. First, we compute the cross sectional median of the volatility of earnings before LLPs and the cross sectional median of the volatility of the earnings after LLPs for a rolling window of eight quarters. Second, we estimate a multivariate regression model to study the link between the volatility of earnings before LLPs with the difference in volatility of earnings before and after LLPs. We further estimate a multivariate logit model in which smoothers are considered as banks which are above the median difference in the volatility of earnings before and after provisions.

We calculate the difference in volatility[3] for a rolling eight quarter window as follows:

$$Diff\ in\ vola\ of\ earnings\ before\ and\ after\ provisions_{\ i,t} = Vola\ earnings\ before\ provisions_{\ i,t} - Vola\ earnings\ after\ provisions_{i,t} \quad (2)$$

Figure 3 shows that, in the majority of the quarters, the volatility of earnings before provisions (dashed line) is higher than the volatility of earnings after provisions (continuous line). This indicates that on average banks smooth their earnings using provisions. The difference seems less pronounced during the crisis period in line with the sample slits.

(Insert Figure 3 here)

We test the above implications of banks' smoothing behavior in a multivariate analysis. Specifically, we investigate whether the difference in the volatility before and after provisions is affected by the volatility of earnings before provisions. A positive coefficient for $Vola\ earnings\ before\ provisions_{i,t}$ would be support for smoothing behavior of banks. We estimate a pooled OLS regression model, as shown in equation (3).

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[3] We measure the volatility as the standard deviation of the variable in the rolling window: $\sigma_i = \sqrt{\frac{\sum_{q_i}^{q_i+8}(X_i - \bar{X})^2}{7}}$.

$$Diff\ in\ vola\ of\ earnings\ before\ and\ after\ provisions_{\ i,t} = \alpha_{\ i,t} * Vola\ earnings\ before\ provisions_{i,t} + \beta_{\ i,t} * Vola\ of\ RWA_{i,t} + \gamma_{\ i,t} * Vola\ of\ Loans_{i,t} + \varepsilon_{i,t} \quad (3)$$

As an alternative to the OLS model we estimate the logit model shown in equation (4). The variable $Dummy\ high\ vola\ of\ earnings\ bef\ and\ after\ LLP_{\ i,t}$ is equal to 1 if the bank is above the median cross sectional volatility difference in earnings before and after LLPs and zero otherwise. Likewise, the variable $Dummy\ high\ vola\ earnings\ before\ provisions_{i,t}$ is equal to 1 if the bank is above the median of the volatility of earnings before LLP and zero otherwise.

$$Dummy\ high\ vola\ of\ earnings\ bef\ and\ after\ LLP_{\ i,t} = \alpha_{i,t} * Dummy\ high\ vola\ earnings\ bef\ prov_{i,t} + \beta_{i,t} * Vola\ of\ RWA_{i,t} + \gamma_{i,t} * Vola\ of\ Loans_{i,t} + \varepsilon_{i,t} \quad (4)$$

In both models we include the variable $Vola\ of\ RWA_{i,t}$ to control for the risk appetite of a bank. Moreover, $Vola\ of\ Loans_{i,t}$ accounts for any difference in the volatility of earnings before and after the accruals, especially for the cyclicality of bank lending. The multivariate analysis includes bank specialization dummies. Robustness checks will follow in Section 5. Table 6 reports the regression results.

(Insert Table 6 here)

In both models we find that the coefficient of the earnings before LLPs is positive, indicating that the higher the volatility of a bank's earnings before LLPs the higher the difference before and after the provisions. A one standard deviation increase in the volatility of earnings before LLP leads to an average 9% increase in the smoothing variable. Furthermore, a decrease in the volatility of risk weighted assets of one standard deviation triggers an increase in the volatility of smoothing by 35% on average. The negative sign of $Vola\ of\ RWA_{i,t}$ indicates that the lower the variable the higher the difference in the volatility of earnings before and after provisions. This indicates that earnings smoothing takes place at banks that exhibit relatively stable risk-weighted assets, suggesting a symmetric bank preference for stable earnings and risk. This findings support hypothesis H2. The expectation that the long term effects of point-in-time management of earnings (H1a) will imply that the long term volatility management (H2a) is also confirmed. The results are unchanged when using 4 quarter volatilities instead of 8 quarter volatilities.

4.4. Consequences for banks' payout policies

We study the motives of earnings management through loan loss provisions by testing whether banks manage their earnings when they are expected to be below the dividend threshold, similarly as in Daniel, Dennis and Naveen (2008; hereinafter: DDN). We examine whether banks that have lower pre-managed earnings than expected dividends create income decreasing discretionary provisions in order to manage earnings downward. Then, we estimate a multivariate regression model to study the link between the discretionary loan loss provisions and the deficit of the pre-managed earnings with respect to the expected dividends. In the remainder, we use yearly data instead of quarterly data because Dutch banks pay dividends at a yearly frequency.

Figure 4 displays how many banks with an expected dividend *Deficit* compared to pre-managed earnings create income increasing discretionary LLPs or income decreasing discretionary LLPs. We find that 86% of the banks with a positive *Deficit* display income decreasing discretionary provisions, as opposed to 34% of the banks with zero *Deficit* that have income decreasing discretionary provisions. The figure suggests that when the expected dividend level is below pre-managed earnings bank increase the discretionary provisions to decrease their earnings.

(Insert Figure 4 here)

For the multivariate regression, we adopt the model of DDN by relating banks' discretionary accruals to the dividend *Deficit* defined as Max (0, previous year dividends – pre-managed earnings). While DDN use income *increasing* discretionary accruals we use discretionary provisions that are income *decreasing* accruals. Thus, we use the discretionary LLPs multiplied with a negative sign to make our results easier comparable with DDN. In the study of DDN a positive *Deficit* indicates that the firm cannot cover expected dividends with pre-managed earnings. For $Nonpayer\ deficit_{i,t}$ the expected dividends are zero, while for $Payer\ deficit_{i,t}$ the expected dividends equal the dividends from the year before. Payers are the companies that paid dividends in the year before. As the sample of DDN excludes financial companies, we translate the variables into the equivalents for banks: DDN's "discretionary accruals" correspond to the "discretionary loan loss provisions" in our study and DDN's "pre-managed earnings" correspond to the "earnings before discretionary loan loss provisions" in our study. We also include a squared term for the $Payer\ deficit_{i,t}$ to test the convexity of the relation. $Discretionary\ LLP\ to\ TL_{\ i,t}$ are calculated using the model of

Wahlen (1994) with the independent variables being $LLP\ to\ TL_{\ i,t-1}$, $\Delta LLR\ \ to\ TL_{\ i,t-1}$ and $Loan\ Size_{\ i,t-1}$. We control for $Size_{i,t-1}$, $Retained\ Earnings_{i\ ,t-1}$, and $Equity\ Ratio_{i,t-1}$.

$$Discretionary\ LLP\ to\ TL_{\ i,t} = \alpha_{i,t} * Payer\ deficit_{i,t} + \ \beta_{i,t} * Nonpayer\ deficit_{\ i,t} + \ \gamma_{i,t-1} * Size_{i,t-1} + \ \delta_{i,t-1} * Equity\ Ratio_{i,t-1} + \ \zeta_{i,t-1} * Retained\ Earnings_{i\ ,t-1} + \ \varepsilon_{i,t} \quad (5)$$

$$Discretionary\ LLP\ to\ TL_{\ i,t} = \ \alpha_{i,t} * Preman\ Earnings_{i,t} + \ \beta_{i,t} * Exp.Div._{i,t} + \ \gamma_{i,t-1} * Size_{i,t-1} + \ \delta_{i,t-1} * Equity\ Ratio_{i,t-1} + \ \zeta_{i,t-1} * Retained\ Earnings_{i\ ,t-1} + \ \varepsilon_{i,t} \quad (6)$$

We estimate a pooled OLS regression model with interacted year-quarter and bank specialization dummies and calculate robust heteroskedasticity-consistent standard errors. The same analysis is carried out with expected dividends, as defined by the Lintner (1965) model and the results are robust to these different specifications. Robustness checks will follow in Section 5. Table 7 reports the results.

(Insert Table 7 here)

The coefficient for $Payer\ deficit_{i,t}$ is negative and significant while the coefficient for $Nonpayer\ deficit_{\ i,t}$ is not significantly different from zero. Similarly as in DDN, we find an association between $Discretionary\ LLP\ to\ TL_{\ i,t}$ and *Deficit* exists for the dividend payers but of different sign in our case. Regarding the convexity of the relation, the positive sign of $Payer\ deficit\ Quadratic_{i,t}$ confirms a U-shaped pattern of earnings management.

$Discretionary\, LLP\; to\; TL_{\,i,t}$ first decrease with higher $Payer\, deficit_{i,t}$ after which they increase.

A one standard deviation increase in $Payer\, deficit_{i,t}$ will decrease by around 34% the $Discretionary\, LLP\; to\; TL_{\,i,t}$. The negative sign of the coefficient for $Payer\, deficit_{i,t}$ confirms that the banks are managing earnings downwards when the pre-managed earnings are below the level of dividends paid one year before. Taking more discretionary loan loss provisions for banks leads to higher loss absorbency in front of unexpected losses. When examining individually the components of the *Deficit*, the coefficient for the $Exp.Div._{i,t}$ is negative and significant, while the coefficient for the $Pre-man\; Earnings_{i,t}$ is positive and significant. These results indicate that discretionary loan loss provisions are positively associated with the level of pre-managed earnings and negatively related to the expected level of dividends.

The fact that we examine banks as opposed to non-financial companies in DDN is an important driver of the results. When expected dividends are below earnings, banks decide to take a "big bath" by increasing discretionary accruals to reduce even further current earnings. (Walsh et al., 1991; Beattie et al., 1994; Christensen et al., 2008; Riedl and Srinivasan, 2010).

5. Further empirical checks and tests of robustness

5.1. Introduction of new accounting standards and bank capital requirements

Two major changes in accounting standards and regulatory rules for banks occurred during our sample period: the introduction of IFRS in 2005 and the introduction of the new capital adequacy framework (Basel II) in 2008. We therefore split the sample based on these two events to test the robustness of the results.

IFRS is compulsory for the listed banks, while there are still 36 Dutch banks of the total of 85 banks in our sample that use local GAAP. According to IFRS provisions for loan losses are determined with an incurred loss model. The application of IFRS might have reduced the amount of the unallocated provisions for loan losses that local GAAP Dutch banks had established in prior years to adequately reflect subjective assessments of credit risk which were not considered on an individual basis. Note that IFRS has recently published the new methodology for loan loss provisions that uses an expected loss method rather than an incurred loss approach. In light of the new methodology, the tradeoff between expected and unexpected losses might become even more important.

The new capital requirements for banks (Basel II) are compulsory for all banks but the mode of adoption and implementation differs across banks because of differentiated approaches for different exposure categories and the possibility for banks to choose between standard and more advanced approaches. Under Basel I, banks were allowed to include LLP in Tier 2 capital up to 1.25% of RWA. Under Basel II, for IRB banks, the expected loss is calculated as the product of one year horizon probability of default (PD) and the loss given default (LGD). If this results in a shortfall (EL>LLP), it is deducted up to 50% from the Tier 1 and 50% from the Tier 2 capital. If this results in a surplus (EL<LLP), it is added up with 0.06% to the Tier 2 capital. Banks that use the standardized approach (SA) under Basel II do not experience a difference compared to Basel I (with a few minor exceptions). Table 8 reports the results for the periods before and after both events.

(Insert Table 8 here)

The analysis of the introduction of IFRS and Basel II impact on $Discretionary\ Earnings_{i,t}$ and $\Delta\ Discretionary\ RWA_{i,t}$ yields similar results as for the full sample period. The only change is that after the introduction of IFRS the coefficient of $\Delta Discretionary\ \ RWA_{i,t}$, is no longer significantly different from zero. The introduction of

Basel II does also not lead to major changes in the coefficients, although the coefficient for earnings management, $Discretionary\ Earnings_{i,t}$, becomes lower indicating a lower flexibility in managing provisions. We perform the robustness checks also for a pooled OLS with clustering, a panel FE and an Arellano Bond (1991) systemic GMM all with robust standard errors. The results of the analysis do not change with different model specifications. We have also performed the analysis for local GAAP versus IFRS banks with similar results[4].

5.2. Discretionary loan loss provisions

Loan loss provisions can be decomposed into a non-discretionary element (i.e., managerial expectations of loan losses) and a discretionary element (i.e., loan loss provisions used for earnings management). The discretionary element can be determined as follows (Wahlen, 1994):

$$LLP\ to\ TL_{i,t} = LoansOutstanding_{i,t-1} + \alpha_{i,t-1} * \Delta NonPerf.Loans_{i,t} + \beta_{i,t-1} * NonPerf.Loans_{i,t-1} + \gamma_{i,t-1} * LoanLossAllowance_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

We use a modified version of this model, i.e., we exclude changes in non-performing loans as there is no complete time series of non-performing loan information available to us. We obtain similar findings when we add GDP growth and aggregate bankruptcy rates, which are key macro-economic determinants of individual non-performing loans.

The results for the main variables remain unchanged in the new specifications. The relation between $Discretionary\ LLP\ to\ TL_{i,t}$ and $Discretionary\ Earnings_{i,t}$ before provisions is still positive and close to 0.7%. The relation between $Discretionary\ LLP\ to\ TL_{i,t}$ and $\Delta Discretionary\ RWA_{i,t}$ is still negative and close to 0.3%. Similarly as in Section 5.1., the

[4] We made an attempt to differentiate between Basel II IRB and SA banks but the current number of observations for the IRB banks is too small to draw robust econometrical conclusions.

dynamic two-step system GMM is displayed. The analysis also includes pooled OLS with clustering, a panel FE and an Arellano Bond (1991) systemic GMM which yield similar results.

(Insert Table 9 here)

Interestingly, the persistence of LLPs signaled by the lagged variable changed signs. The lagged $Discretionary\ LLP\ to\ TL_{i,t}$ becomes negative in the robustness test compared to the positive coefficient in the model of $LLP\ to\ TL_{i,t}$. This might indicate that if a bank had high discretionary provisions in one quarter the subsequent discretionary provision will be lower.

5.3. *An alternative model of dividends*

Using the model of Lintner (1956), we re-calculate the expected dividend as a function of current earnings and the prior dividend. The standard partial adjustment model describes the dividend policy with two main parameters: the target dividend payout ratio and the adjustment rate. After calculating the expected dividend from this model, we re-calculate the Deficit as shortfall in Pre-managed Earnings with respect to the re-calculated Expected Dividends and, as previously, we set 0 as the lower bound.

(Insert Table 10 here)

The results are largely unchanged. The only difference appears in Model 1.2., in which the $Nonpayer\ Deficit_{i,t}$ becomes significant. Such a result could be due to the fact that the approach might overstate the likelihood of a dividend cut, as also As Daniel, Denis and Naveen (2008) point out.

5.4. Institutional characteristics and structure of the Dutch banking system

We exclude the largest four banks from the sample to test the robustness of the results. For the Dutch banking system, the largest four banks account for much more than 50% of total bank assets. When we exclude these banks from our sample the main results remain virtually unchanged compared to the full sample analysis.[5]

First, we use the new sample of 81 banks before computing the model for calculating the discretionary earnings and risk variables with the coefficient being the same sign and virtually the same value as before. We input these newly calculated variables in the analysis yielding $\Delta Discretionary\ Earnings_{i,t}$ highly significant and positive and $\Delta Discretionary\ RWA_{i,t}$ highly significant and negative in line with Hypothesis 1. Second, for the model of earnings smoothing through loan loss provisions, the new sample yields similar coefficients. $Volatility\ of\ earnings\ before\ LLP_{i,t}$ is positive and significant while $Volatility\ of\ RWA_{i,t}$ is negative and significant. Third, for the analysis of dividend thresholds and discretionary LLP management, the coefficients are also virtually unchanged with $Payer\ Deficit_{i,t}$ significant and negative and $Nonpayer\ Deficit_{i,t}$ not significant.

In further robustness checks considering the structure banking system we estimated the model for domestic and foreign banks in the Netherlands and the results for the main variables remain unchanged. Furthermore, we also split the sample for financial conglomerates and stand-alone banks and the results are similar.

6. Conclusion

We take a new perspective on banks' earnings management with loan loss provisions by examining its implications for bank risk. Our study is based on supervisory quarterly data on Dutch banks from the period from 1998 to 2012. Using supervisory data has a number of

[5] Tables are available upon request from the authors.

advantages. The data are comprehensive, complete, and make it possible for us to analyze banks' changes in risk-weighted assets at a quarterly frequency over a relatively long sample period. Moreover, general loan loss provisions of Dutch banks are neither tax-deductible nor recognized as Tier 2 capital. The latter allows us to study bank earnings and capital management through loan loss provisions in a more homogeneous setting than cross-country studies.

Our analysis yields three principal results. First, we find that banks create higher LLPs when discretionary earnings are high and lower LLPs when discretionary risk-weighted assets increase. These findings are robust to various model specifications and the usage of Wahlen (1994) discretionary LLPs. Second, banks smooth the volatility of their earnings with LLPs. Specifically, in a rolling window analysis we show that banks reduce the volatility of their earnings through their loan loss provisioning behavior, which is consistent with smoothing. Third, dividend-paying banks with expected dividends lower than the current earnings are likely to increase discretionary LLPs. This behavior differs from that of non-financial companies that are found to manage earnings upwards when unable to pay dividends (Daniel, Denis and Naveen, 2008).

Our study adds novel evidence by introducing a risk perspective to the earnings management through LLPs literature and evidence of bank dividend based management. Our findings reveal a trade-off relation between changes in risk-weighted assets (unexpected losses) and loan loss provisions (expected losses) contributing to the research on the capital management hypothesis (e.g., Kim and Kross, 1998). Moreover, we provide new insights on the dividend based earnings management as banks manage earnings downward when the expected dividends cannot be met. Accounting standard setters, financial supervisors and regulators should take into account that banks' use of loan loss provisions can be seen as a double-edged sword as they affect profitability and risk simultaneously.

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Table 1. Summary statistics

This table reports main summary statistics for the main variables of 85 Dutch banks (5,081 bank-year observations) during the period from Q1:1998 to Q3:2012.

Variable	Definition	Number of observations	Mean	Median	Std. Dev.	P10	P90
ROA before LLP (%)	Net income before loan loss provisions(t) / Total Assets(t-1)	2,040	5.035	3.617	6.371	0.040	12.488
LLP scaled (%)	Loan loss provisions(t) / Net loans (t-1)	2,040	0.027	0.006	0.001	-0.004	0.060
ROA after LLP (%)	Net income after loan loss provisions / Total Assets (t-1)	2,040	3.269	2.787	6.199	-1.666	9.910
ΔRWA	ln (RWA Credit/RWA Credit(t-4))	3,318	0.052	0.052	0.142	-0.343	0.426
ΔDividend	Δ[Dividend / Total Assets (t-1)]	4,259	0.003	0.000	0.007	0.000	0.008
Debt growth	Yearly Δ in Debt (t) / Debt (t-1)	4,743	0.056	0.014	0.364	-0.178	0.271
Leverage	Total Debt / Total Assets	3,667	0.865	0.915	0.159	0.695	0.966
ΔGDP	Yearly Δ[GDP (t) / GDP (t-1)]	4,467	0.016	0.020	0.022	-0.010	0.043
Average loan growth	Avg. (% Loan growth from year(t) to year (t-1))	4,202	0.381	0.067	10.885	-0.065	0.830
ΔBankruptcy	Yearly Δ[Bankruptcy (t) / Bankruptcy (t-1)]	4,467	0.083	0.049	0.228	-0.161	0.336
LLR scaled	Loan loss reserves (t) / Net loans (t-1)	3,941	0.012	0.002	0.003	0.000	0.020
Capital buffer	[Total Capital (t) /RWA Total (t-1)] - 8%	3,647	0.033	0.010	0.047	0.002	0.083
Capital Ratio	Regulatory Capital (t) / Total RWA (t-1)	3,647	0.135	0.085	0.089	0.033	0.304
Size (Total Assets)	in million EUR	5,081	13.485	13.507	2.910	0.218	17,900.000
Loan size	in million EUR	4,967	13.144	13.186	2.830	0.167	13,900.000

Table 2. Model of discretionary earnings

This table reports the estimation results for different models of discretionary earnings. The dependent variable, *ROA before LLP* $_{i,t}$, is the earnings before LLP scaled by total assets from the previous year-quarter. Smoothing is accounted for using the first lag of the *ROA before LLP* $_{i,t}$. *ΔDividend* $_{i,t-1}$ is the lagged change in the paid dividend scaled by total assets. *ΔGDP* $_{i,t-1}$ is the lagged % change in the GDP over the previous year. *Debt growth* $_{i,t-1}$ is the lagged yearly % change in total debt. *Leverage* $_{i,t-1}$ is the lagged total debt over total assets. Model 1 is a pooled Ordinary Least Squared (OLS) with standard errors clusters on banks. Model 2 is a fixed effects panel data regression with robust standard errors. Model 3 and Model 4 are the dynamic two-step system GMM panel estimator as proposed by Arellano and Bond (1991) and Blundell and Bond (1998), respectively. For Model 3 and 4 only the lagged dependent variable (*ROA before LLP* $_{i,t-1}$) is treated as endogenous, so that ''GMM-style'' instruments of higher lags are created. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. ROA before LLP $_{i,t}$	**(1) OLS**		**(2) Panel FE**		**(3) GMM**		**(4) System GMM**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
ROA before LLP $_{i,t-1}$	0.6979***	0.000	0.5592***	0.000	0.4184***	0.000	0,4238***	0.000
ΔDividend $_{i,t-1}$	33.6911**	0.018	26.5819***	0.000	23.4839***	0.000	26,9691***	0.000
ΔGDP $_{i,t-1}$	74.9654***	0.001	71.7943**	0.050	72.3611**	0.047	65,25404*	0.074
Debt growth $_{i,t-1}$	-0.3100**	0.016	-0.3480***	0.000	-0.4012***	0.000	-0,3970***	0.000
Leverage $_{i,t-1}$	-1.3792*	0.088	-1.0754**	0.031	-2.3819***	0.000	-2,7228***	0.000
Interacted quarter & bank specialization dummies		*Yes*		*Yes*		*Yes*		*Yes*
Constant	-2.5638**	0.02	-1.5006	0.340	-1.5444	0.413	1,3317	0,488
Number of observations		1226		1226		1103		1103
Adjusted R^2		59%		58%				
Wald chi2						674		1695
Prob > chi2						0.00		0.00
Endogenous variables (''GMM-style'' instruments)					ROA before LLP $_{i,t-1}$		ROA before LLP $_{i,t-1}$	

Table 3. Model of discretionary changes in risk-weighted assets

This table reports the estimation results for the model of discretionary changes in risk-weighted assets. The dependent variable, *ΔRWA* $_{i,t}$ is the change in the credit risk-weighted assets from the previous period to year-quarter t. *Average loan growth* $_{i,t-1}$ is the lagged average growth of the loan portfolio over the past two quarters relative to the previous year. *ΔBankruptcy* $_{i,t-1}$ is the yearly change in total bankruptcies in the Netherlands. *Size* $_{i,t-1}$ is calculated as the lagged natural logarithm of total assets. *LLR to TL* $_{i,t-1}$ is the lagged loan loss reserves scaled over the previous period total loans. *Loan to Deposits* $_{i,t-1}$ is the lagged total loans to total deposits. Model 1 is a pooled Ordinary Least Squared (OLS) with standard errors clustered on banks. Model 2 is a fixed effects panel data regression with robust standard errors. Model 3 and Model 4 are the dynamic two-step system GMM panel estimator as proposed by Arellano and Bond (1991) and Blundell and Bond (1998), respectively. For Model 3 and 4 only the lagged dependent variable (*ΔRWA* $_{i,t-1}$) is treated as endogenous, so that ''GMM-style'' instruments of higher lags are created. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. Δ RWA $_{i,t}$	**(1) Pooled OLS**		**(2) Panel FE**		**(3) GMM**		**(4) System GMM**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
ΔRWA $_{i,t-1}$					0.5547***	0.000	0,5626***	0,000
Average loan growth $_{i,t-1}$	0.1126**	0.020	0.0808***	0.000	0.0087	0.418	0,0178*	0,092
ΔBankruptcy $_{i,t-1}$	4.6980**	0.013	5.3010***	0.000	5.0626***	0.000	5,0320***	0,000
Size $_{i,t-1}$	0.1348***	0.004	0.1066***	0.000	0.1037***	0.000	0,1039***	0,000
LLR to TL $_{i,t-1}$	-0.7206***	0.000	-1.1507***	0.000	-0.7719***	0.000	-0,7365***	0,000
Loan to Deposits $_{i,t-1}$	-0.0021***	0.002	-0.0012***	0.029	-0.0027***	0.009	-0,0028***	0,007
Interacted quarter & bank specialization dummies		*Yes*		*Yes*		*Yes*		*Yes*
Constant	0.7867*	0.079	1.0055***	0.000	1.0449***	0.000	1,2182	0,24
Number of observations		2719		2719		2610		2610
Adjusted R^2		19%		17%				
Wald chi2						1740		2181
Prob > chi2						0.00		0.00
Endogenous variables (''GMM-style'' instruments)					Δ RWA $_{i,t-1}$		Δ RWA $_{i,t-1}$	

Table 4. Analysis of earnings levels and risk management

This table reports the estimation results for the combined model of banks' earnings and risk management through LLPs. The dependent variable, *LLP to TL* $_{i,\ t}$ is the LLP scaled to total loans from the previous period. *Discretionary earnings* $_{i,\ t}$ and *ΔDiscretionary RWA* $_{i,\ t}$ are calculated from the models shown in Table 2 and Table 3, respectively. *ΔLLR to TL* $_{i,\ t-1}$ is the change in loan loss reserves to total loans. *Loan size* $_{i,\ t-1}$ is calculated as the lagged natural logarithm of total loans. *RWA absolute* $_{i,\ t-1}$ is the lagged natural logarithm of the credit risk-weighted assets. *Capital buffer* $_{i,\ t-1}$ is the lagged buffer of total regulatory capital over total risk-weighted assets minus 8%. The model used is the dynamic two-step system GMM panel estimator as proposed by Blundell and Bond (1998). For Model 3 and 4 only the lagged dependent variable (*LLP to TL* $_{i,\ t-1}$) is treated as endogenous, so that ''GMM-style" instruments of higher lags are created. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. LLP to TL $_{i,\ t}$	**(1) System GMM**		**(2) System GMM**		**(3) System GMM**		**(4) System GMM**		**(5) System GMM**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
LLP to TL $_{i,\ t-1}$	0.4330***	0.000	0.4972***	0.000	0.5150***	0.000	0.5168***	0.000	0.5090***	0.000
Discretionary earnings $_{i,\ t}$	0.0066***	0.000	0.0070***	0.000	0.0071***	0.000	0.0072***	0.000	0.0068***	0.000
ΔDiscretionary RWA $_{i,\ t}$			-0.0023**	0.019	-0.0045***	0.000	-0.0039***	0.000	-0.0025**	0.012
ΔLLR to TL $_{i,\ t-1}$					-0.0434***	0.000	-0.0478***	0.000	-0.0454***	0.000
Loan Size $_{i,\ t-1}$					-0.0011***	0.001	-0.0045***	0.000	-0.0027***	0.000
RWA absolute $_{i,\ t-1}$							0.0033***	0.000		
Capital buffer $_{i,\ t-1}$									-0.0175***	0.000
Interacted quarter & bank specialization dummies		*Yes*		*Yes*		*Yes*		*Yes*		*Yes*
Constant	-0.0047	0.819	-0.0139	0.492	0.0030	0.882	-0.0019	0.924	0.0267	0.179
Number of observations		1226		1168		1168		1168		1168
Wald chi2		1653		1930		2128		2126		2276
Prob > chi2		0.00		0.00		0.00		0.00		0.00
Endogenous variables (''GMM-style" instruments)	LLP to TL $_{i,\ t-1}$		LLP to TL $_{i,\ t-1}$		LLP to TL $_{i,\ t-1}$		LLP to TL $_{i,\ t-1}$		LLP to TL $_{i,\ t-1}$	

Table 5. Analysis of earnings levels and risk management on subsamples

This table reports the estimation results for the model from Table 4 on subsamples. (1) High (Low) ROA before LLP is the sample data above (below) the median ROA before LLP. (2) High (Low) volatility is the sample data above (below) the median volatility. (3) 4^{th} (1^{st}, 2^{nd} and 3^{rd} quarters) quarter(s) is the sample data in the 4^{th} quarter (1st, 2nd and 3rd quarters). (4) High (Low) capital ratio is the sample data above (below) the median capital ratio. (5) Dividend payout (no dividend payout) is the sample data for the firms that pay (do not pay) dividends in a given year. Coefficients of the control variables ($LLP\ to\ TL_{i,\ t-1}$, $\Delta LLR\ to\ TL_{i,\ t-1}$, $Loan\ Size_{i,\ t-1}$) are not shown. The model used is the dynamic two-step system GMM panel estimator as proposed by Blundell and Bond (1998). The lagged dependent variable ($LLP\ to\ TL_{i,\ t-1}$) is treated as endogenous, so that ''GMM-style'' instruments of higher lags are created. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. $LLP\ to\ TL_{i,\ t}$	**(1) Level ROA before LLP**		**(2) Vola ROA before LLP**		**(3) Quarters**		**(4) Tier 1 Capital Ratios**		**(5) Dividend payout**		**(6) Crisis**	
	High	**Low**	**High**	**Low**	**4th**	**1st, 2nd and 3rd**	**High**	**Low**	**Yes**	**No**	**Yes**	**No**
	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value
Discretionary earnings $_{i,\ t}$	0.0105*** 0.000	0.0005* 0.089	0.0068*** 0.000	0.0043*** 0.000	0.0035*** 0.000	0.0061*** 0.000	0.0092*** 0.000	0.0037*** 0.000	0.0028*** 0.000	0.0083*** 0.000	0.0041*** 0.000	0.0076*** 0.000
p-value diff.	0.000		0.182		0.491		0.000		0.000		0.000	
ΔDiscretionary RWA $_{i,\ t}$	-0.0036** 0.010	-0.0020** 0.011	-0.0056*** 0.000	0.0003 0.598	-0.0042*** 0.002	-0.0041*** 0.001	-0.0056*** 0.004	-0.0014* 0.086	0.0030*** 0.002	-0.0065*** 0.000	-0.0050* 0.059	-0.0041*** 0.000
p-value diff.	0.015		0.022		0.000		0.000		0.006		0.000	
Number of obs.	612	556	596	572	338	830	444	724	446	722	263	905
Wald chi2	1582	350	1.091	762	1.444	1.078	1.081	973	764	1.521	365	1864
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 6. Analysis of earnings smoothing

This table reports the estimation results for earnings and risk smoothing. The volatilities are calculated over a rolling window of eight quarters. *Difference in earnings vola bef and after LLP* $_{i,\, t\text{-}1}$ is calculated as the difference in the volatility of ROA before and after provisions in the rolling window. *Volatility earnings before LLP* $_{i,\, t\text{-}1}$ is calculated as the volatility of earnings before loan loss provisions in the rolling window. *Volatility of RWA* $_{i,\, t}$ is the volatility of credit risk weighted assets in the rolling window. *Volatility of Loans* $_{i,\, t}$ is the volatility of net loans in the rolling window. *Dummy high difference in vola of earnings bef and after LLP* $_{i,\, t}$ is a dummy equal to 1 if the banks' volatility is above the median difference in volatility of earnings before and after provisions (based on the cross sectional median of the volatility in the eight quarter rolling window) and 0 if it is below the median. *Dummy high volatility before LLP* $_{i.\, t\text{-}1}$ is a dummy equal to 1 if the volatility of earnings before LLPs is above the median across banks and 0 if it is below the median. *Dummy high volatility of RWA* $_{i.\, t}$ is a dummy equal to 1 if the volatility of risk weighted assets is above the median across banks and 0 if it is below the median. Models 1.1 and 1.2 are pooled OLS models. Models 2.1 and 2.2 are logit models. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. Difference in earnings vola before and after provisions $_{i,\, t}$	**(1.1) Pooled OLS**		**(1.2) Pooled OLS**		**(2.1) Logit**		**(2.2) Logit**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
Volatility earnings before LLP $_{i,\, t}$	0.0907*	0.052	0.0895*	0.063				
Volatility of RW $_{i,\, t}$	-0.4086***	0.000	-0.3431***	0.002				
Dummy high volatility before LLP $_{i.\, t}$					0.5901**	0.031	0.6640**	0.019
Dummy high volatility of RW $_{i.\, t}$					-0.8868***	0.001	-0.5665**	0.055
Volatility of Loans $_{i,\, t}$			-0.3676**	0.026			-4.9509**	0.003
Constant	0 .0476	0.631	0.0851	0.392	0.3164	0.123	0.6218***	0.006
Bank specialization dummies	*Yes*		*Yes*		*No*		*No*	
Number of observations		240		240		240		240
Adjusted R^2		26%		28%		4%		7%

Table 7. Analysis of dividend threshold and LLP management

This table reports the estimation results for the model used to calculate the relation between the dividend threshold and earnings management through discretionary loan loss provisions. The dependent variable, *Discretionary LLP to TL* $_{i,\,t}$ is calculated from a modified version of the model of Wahlen (1994). The independent variables are *LLP to TL* $_{i,\,t-1}$, *ΔLLR to TL* $_{i,\,t-1}$ and *Loan Size* $_{i,\,t-1}$. *Payer deficit* $_{i,\,t,}$ *t* is calculated following Daniel, Denis and Naveen (2008) as the shortfall *Pre-managed Earnings* $_{i,\,t}$ with respect to *Expected Dividends* $_{i,\,t}$ and is measured as Max (0, Expected Dividends - Pre-managed Earnings)/Total Assets. A positive Deficit indicates that the bank cannot cover expected dividends from Pre-managed Earnings. For Non-Payers, the expected dividends are zero, while for Payers expected dividends equal the prior year's dividends. *Pre-managed earnings* $_{i,\,t}$ are the Earnings before Non-discretionary Accruals scaled by Total Assets. *Payer deficit Quadratic* $_{i,\,t}$ is the squared terms of this variable. *Expected dividends* $_{i,\,t}$ are the dividends from the prior year scaled by Total Assets. *Size* $_{i,\,t-1}$ is equal to the natural logarithm of Total Assets. *Equity ratio* $_{i,\,t-1}$ is calculated as Total Equity over Total Assets. *Retained earnings* $_{i,\,t-1}$ are calculated as Retained Earnings scaled by Total Assets. The model used is a pooled OLS. The data come from 85 banks during the period from 1998 to 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. Discretionary LLP to TL $_{i,\,t}$	**1.1. Pooled OLS**		**1.2. Pooled OLS**		**1.3. Pooled OLS**		**1.4. Pooled OLS**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
Payer deficit $_{i,\,t}$	-0.4420***	0.000	-0.7512***	0.001				
Payer deficit Quadratic $_{i,t}$			5.9436**	0.047				
Nonpayer deficit $_{i,\,t}$	-0.0033	0.955	-0.0580	0.321				
Pre-managed earnings $_{i,\,t}$					0.0958***	0.002	0.0852***	0.005
Expected dividends $_{i,\,t}$					-0 .5165**	0.021	- 0.6914***	0.003
Size $_{i,\,t-1}$	-0.0066***	0.000	-0.0580	0.321	-0.0062***	0.000	-0.0064***	0.000
Equity ratio $_{i,\,t-1}$	-0.0324**	0.001	-0.0311***	0.002	-0.0453***	0.000	-0.0443**	0.000
Retained earnings $_{i,\,t-1}$	0.0594**	0.002					0.0488**	0.009
Interacted quarter & bank specialization dummies				*Yes*		*Yes*		*Yes*
Constant	-0.1040***	0.000	0.1194***	0.000	-0.1197***	0.000	-0.0107**	0.149
Number of observations		367		367		367		367
Adjusted R^2		55%		54%		55%		55%

Table 8. Introduction of new accounting standards (IFRS) and new regulatory capital requirements (Basel II)

This table reports the estimation results for the main model (see Table 4) for the data before and after introduction of the IFRS rules (2005) and the data before and after the introduction of Basel II (2008). The dependent variable, *LLP to TL* $_{i,\,t}$ is the LLPs scaled to total loans from the previous period. *Discretionary earnings* $_{i,\,t}$ and *ΔDiscretionary RWA* $_{i,\,t}$ are calculated from the discretionary models regressions (see Table 2 and Table 3, respectively). *ΔLLR to TL i, t-1* is the change in loan loss reserves to total loans. *Loan size* $_{i,\,t-1}$ is calculated as the lagged natural logarithm of total loans. The model used is the dynamic two-step system GMM panel estimator as proposed by Blundell and Bond (1998). The lagged dependent variable (*LLP to TL* $_{i,\,t-1}$) is treated as endogenous, so that ''GMM-style'' instruments of higher lags are created. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. LLP to TL $_{i,\,t}$	**After IFRS (2005)**		**Before IFRS (2005)**		**After Basel II (2008)**		**Before Basel II (2008)**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
LLP to TL $_{i,\,t-1}$	0.6464***	0.000	0.3528***	0.000	0.3722***	0.000	0.3614***	0.000
Discretionary earnings $_{i,\,t}$	0.0056***	0.000	0.0092***	0.000	0.0041***	0.000	0.0080***	0.000
ΔDiscretionary RWA $_{i,\,t}$	-0.0027	0.170	-0.0046***	0.000	-0.0050**	0.059	-0.0042***	0.000
ΔLLR to TL $_{i,\,t-1}$	-0.0746***	0.005	-0.0336***	0.000	0.2558***	0.000	-0.0309***	0.000
Loan Size $_{i,\,t-1}$	-0.0024***	0.000	-0.0011**	0.028	-0.0028**	0.051	-0.0011***	0.000
Interacted quarter & bank specialization dummies		*Yes*		*Yes*		*Yes*		*Yes*
Constant	0.0090	0.530	-0.0482	0.213	0.0084	0.744	-0.2995***	0.000
Number of observations		442		616		263		1100
Wald chi2		1158		902		365		1135
Prob > chi2		0.000		0.000		0.000		0.000
Endogenous variables (''GMM-style'' instruments)		LLP to TL $_{i,\,t-1}$		LLP to TL $_{i,\,t-1}$		LLP to TL $_{i,\,t-1}$		LLP to TL $_{i,\,t-1}$

Table 9. Discretionary loan loss provisions

This table reports the estimation results for the model used to calculate earnings management through discretionary LLPs and influence on bank asset risk. The dependent variable, *Discretionary LLP to TL* $_{i,\,t}$ is estimated separately from a modified version of the model of Wahlen (1994). The independent variables are *LLP to TL* $_{i,\,t-1}$, *ΔLLR to T* $_{,i,t-1}$ and *Loan Size* $_{i,\,t-1}$. *Discretionary earnings* $_{i,\,t}$ and *ΔDiscretionary RWA* $_{i,\,t}$ and are calculated from the discretionary models regressions (see Table 2 and respectively Table 3). *ΔLLR to TL i, t-1* is the change in loan loss reserves to total loans. *Loan size* $_{i,\,t-1}$ is calculated as the lagged natural logarithm of total loans. *RW absolute* $_{i,\,t-1}$ is the lagged natural logarithm of the credit risk weighted assets. *Capital buffer* $_{i,\,t-1}$ is the lagged buffer of total regulatory capital over total risk weighted assets minus 8%. The model used is the dynamic two-step system GMM panel estimator as proposed by Blundell and Bond (1998). The lagged dependent variable (*LLP to TL* $_{i,\,t}$) is treated as endogenous, so that ''GMM-style'' instruments of higher lags are created. The data come from 85 banks during the period from Q1 1998 to Q3 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. Discretionary LLP to TL $_{i,\,t}$	**(1) System GMM**		**(2) System GMM**		**(3) System GMM**		**(4) System GMM**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
Discretionary LLP to TL $_{i,\,t-1}$	-0.2289***	0.000	-0.1990***	0.000	-0.1922***	0.000	-0.2124***	0.000
Discretionary Earnings $_{i,\,t}$	0.0070***	0.000	0.0072***	0.000	0.0073***	0.000	0.0070***	0.000
ΔDiscretionary RWA $_{i,\,t}$			-0.0037***	0.000	-0.0036***	0.000	-0.0013***	0.010
RW absolute $_{i,\,t-1}$					-0.0005*	0.072		
Capital buffer $_{i,\,t-1}$							-0.0144***	0.000
Interacted quarter & bank specialization dummies		*Yes*		*Yes*		*Yes*		*Yes*
Constant	-0.0670**	0.000	-0.0119*	0.114	-0.0089	0.332	-0.0107**	0.149
Number of observations		1137		1100		1100		1100
Wald chi2		642		639		643		764
Prob > chi2		0.000		0.000		0.000		0.000
Endogenous variables (''GMM-style'' instruments)		LLP to TL $_{i,\,t-1}$		LLP to TL $_{i,\,t-1}$		LLP to TL $_{i,\,t-1}$		LLP to TL $_{i,\,t-1}$

Table 10. Analysis of dividend thresholds and discretionary LLP management using the model of Lintner (1956)

This table reports the estimation results for the model used to calculate the relation between the dividend threshold and earnings management through discretionary loan loss provisions. The dependent variable, *Discretionary LLP to TL* $_{i,t}$ is calculated from a modified version of the model of Wahlen (1994). The independent variables are *LLP to TL* $_{i,t-1}$, *ΔLLR to TL* $_{i,t-1}$ and *Loan Size* $_{i,t-1}$. *Payer deficit* $_{i,t,}$ *t* is calculated following Daniel, Denis and Naveen (2008) as the shortfall *Pre-managed Earnings* $_{i,t}$ with respect to *Expected Dividends* $_{i,t}$ and is measured as Max (0, Expected Dividends - Pre-managed Earnings)/Total Assets. A positive Deficit indicates that the firm cannot cover expected dividends from Pre-managed Earnings. For Non-Payers, the expected dividends are zero, while for Payers expected dividends equal the prior year's dividends. *Pre-managed earnings* $_{i,t}$ are the Earnings before Non-discretionary Accruals scaled by Total Assets. *Expected dividends* $_{i,t}$ are calculated using the Lintner (1956) model (including for the calculation of the Deficit). *Size* $_{i,t-1}$ is equal to the natural logarithm of Total Assets. *Equity ratio* $_{i,t-1}$ is calculated as Total Equity over Total Assets. *Retained earnings* $_{i,t-1}$ are calculated as Retained Earnings scaled by Total Assets. The model is estimated as a pooled OLS regression. The data come from 85 banks during the period from 1998 to 2012. P-values are based on robust standard errors. ***, **, * indicate statistical significance at the 1%, 5%, and 10%-level.

Dep. Var. Discretionary LLP to TL $_{i,t}$	**1.1. Pooled OLS**		**1.2. Pooled OLS**		**1.3. Pooled OLS**		**1.4. Pooled OLS**	
Explanatory variables	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val	Coeff.	p-val
Payer deficit $_{i,t}$	-0.4665**	0.020	-0.4718**	0.017				
Nonpayer deficit $_{i,t}$	-0.0926	0.157	-0.1482**	0.027				
Pre-managed earnings $_{i,t}$					0.0958***	0.002	0.1848***	0.000
Expected dividends $_{i,t}$					-0.5165**	0.021	-0.2099	0.429
Size $_{i,t-1}$	-0.0065***	0.000	-0.0064***	0.000	-0.0062***	0.000	-0.0059***	0.000
Equity ratio $_{i,t-1}$	-0.0334***	0.001	-0.0320***	0.002	-0.0453***	0.000	-0.06135**	0.000
Retained earnings $_{i,t-1}$			0.0840**	0.002			0.0782**	0.014
Interacted quarter & bank specialization dummies		*Yes*		*Yes*		*Yes*		*Yes*
Constant	-0.1258***	0.000	-0.1257***	0.000	-0.1197***	0.000	-0.1153***	0.000
Number of observations		301		301		301		301
Adjusted R^2		54%		56%		54%		58%

Figure 1. Histogram of the return on assets before and after LLPs

Figure 1 shows the fiscal year return on assets (ROA) before LLPs.

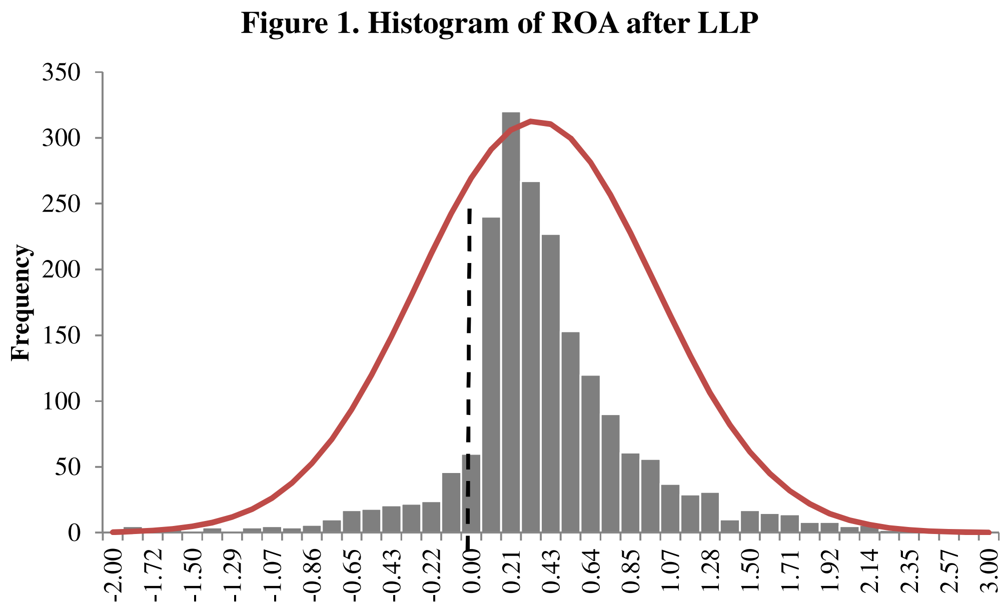


Figure 2. Time series relation between median LLP and median RWA change across banks

The broken line represents the cross sectional median $\Delta RWA_{i,t}$ calculated as the change in credit risk-weighted assets from the previous year in year-quarter t. The solid line represents the cross sectional median of $LLP\ to\ TL_{i,t}$, calculated as the LLP scaled to total loans from the previous period.

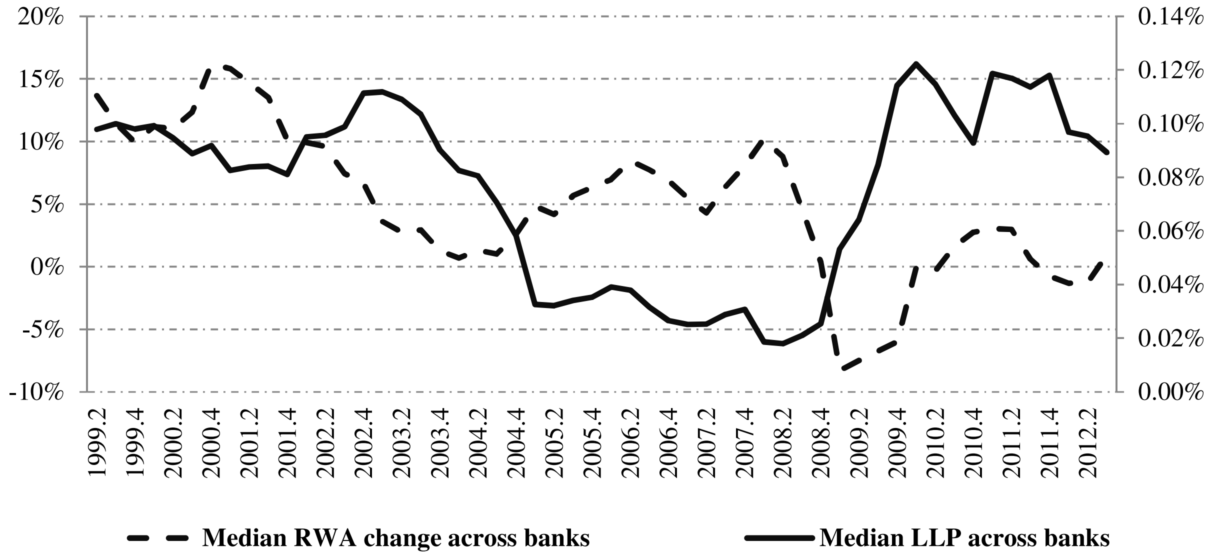


Figure 3. Difference in volatility of return on assets before and after provisions

The solid line represents the cross sectional median of the *Volatility ROA before LLP* $_{i,\ t-1}$ calculated as the eight-quarter volatility of earnings before loan loss provisions. The broken line represents the cross sectional median of the *Volatility ROA after LLP* $_{i,\ t-1}$ calculated as the eight-quarter volatility of earnings after loan loss provisions.

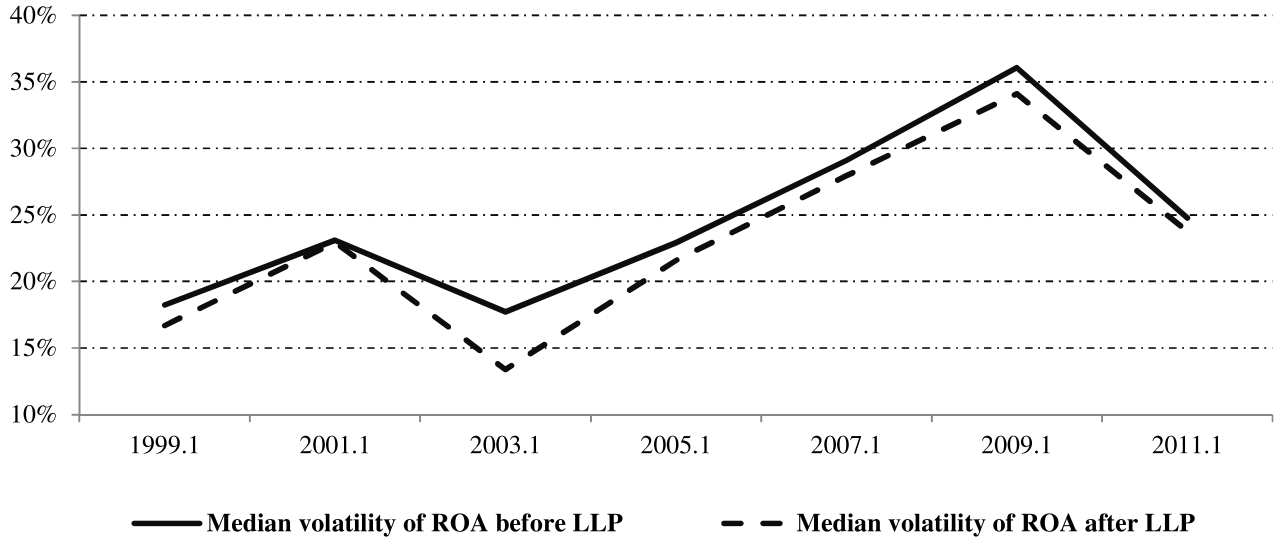
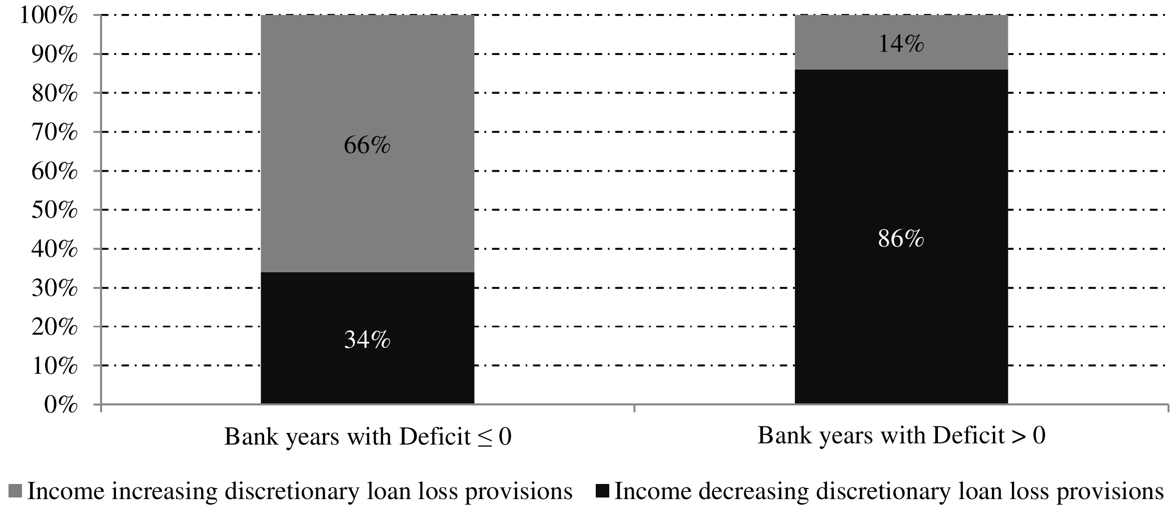


Figure 4. Dividend threshold and discretionary provisions

The discretionary provisions *Discretionary LLP to TL* $_{i,\,t}$ are calculated from a modified version of the model of Wahlen (1994) with the independent variables being *LLP to TL* $_{i,\,t-1}$, *ΔLLR to TL* $_{i,\,t-1}$ and *Loan Size* $_{i,\,t-1}$. *Deficit* $_{i,\,t,}$ *t* is calculated following Daniel, Denis and Naveen (2008) as the shortfall *Pre-managed Earnings* $_{i,\,t}$ with respect to *Expected Dividends* $_{i,\,t}$ and is measured as Max (0, Expected Dividends - Pre-managed Earnings)/Total Assets. A positive *Deficit* indicates that the bank cannot cover expected dividends with pre-managed Earnings.



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