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Determinants for Using Visible Reserves in German Banks – An Empirical Study*

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Abstract

The German Commercial Code ('HGB') allows banks to build visible reserves for general banking risks according to section 340g HGB. These 'GBR reserves' may, in addition to their risk provisioning function, be used to enhance capital endowment, for internal financing, signaling or earnings management purposes. We analyze financial statements of German banks for the period from 1995 through 2007 to reveal specific patterns in the use of GBR reserves. Our empirical investigation is based on a large, unbalanced panel of German banks including 32,023 bank-year observations. We see an increase in the use of GBR reserves over time. Furthermore, we can say that GBR reserves are primarily used by large banks, banks with comparatively low regulatory capital endowment, as well as those with lower risks. Furthermore, GBR reserves are used by fairly profitable banks, those reporting according to international financial reporting standards in addition to HGB, and banks which are not thrifts or cooperative banks. Finally, we find that banks which make use of hidden reserves according to section 340f HGB also tend to hold GBR reserves. We explain our findings with regulatory factors and existing information asymmetries as well as banks' size and ownership structure.

Key Words: Bank regulation, informational asymmetries, risk provisioning, visible reserves, hidden reserves.

JEL Classification: G21, G32, M41.

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Non-technical summary

Section 340g of the German Commercial Code ('HGB') allows banks to build visible reserves for general banking risks (henceforth: GBR reserves). Obviously, these visible reserves are meant to take account of any kind of general risks banks may be exposed to. They have to be disclosed as a separate item on the liability side of the balance sheet and their allocation is clearly visible from the profit and loss account. They are acknowledged as tier 1 capital and the decision to set them aside is taken by the bank's management. In addition to their risk provisioning function, these visible reserves may also be used to enhance capital endowment, for internal financing and for signaling purposes.

We analyze the financial statements of German banks for the period from 1995 through 2007 to reveal specific patterns in the use of GBR reserves. We explain our findings with regulatory aspects and existing information asymmetries as well as the size and the ownership structure of banks. Our results are as follows:

- Larger banks are more likely to use visible GBR reserves, and they also hold a higher percentage of these reserves relative to their total assets. The same holds for banks with low regulatory capital endowment and for banks which are already using hidden reserves according to section 340f HGB.
- Banks subject to public law make use of GBR reserves less often and to a smaller extent. The same relationship is found for banks with higher risks in their loan portfolios, i.e. for banks with relatively high non-performing loan ratios.
- Banks with a higher return on assets and banks under IFRS tend to build GBR reserves more often and to a greater extent.
- Both the share of banks making use of GBR reserves and the ratio of these reserves to total assets increase over time. This almost monotonic trend is confirmed even when controlling for all other relevant factors in panel regressions.

Nichttechnische Zusammenfassung

Das deutsche Handelsgesetzbuch (HGB) erlaubt Kreditinstituten die Bildung eines Fonds für allgemeine Bankrisiken nach § 340g. Sowohl die Bildung als auch die Höhe dieser Reserven müssen in der Gewinn- und Verlustrechnung bzw. in der Bilanz eines Instituts klar ausgewiesen werden. Sie werden als Kernkapital anerkannt und die Entscheidung über ihre Bildung wird vom Bankmanagement getroffen. Zusätzlich zur Risikoabsicherung können diese Reserven auch zur Erhöhung der Kapitalausstattung, zur internen Finanzierung und zu Signalisierungszwecken genutzt werden.

Wir untersuchen Bilanzdaten deutscher Banken im Zeitraum 1995 bis 2007, wobei wir spezifische Verhaltensmuster in der Nutzung des Fonds für allgemeine Bankrisiken aufzeigen. Wir erklären unsere Erkenntnisse mit regulatorischen Gegebenheiten, existierenden Informationsasymmetrien, sowie durch die Größe und die Eigentümerstruktur von Banken. Unsere Ergebnisse sind wie folgt:

- Größere Banken weisen eine höhere Wahrscheinlichkeit zur Bildung von 340g-Reserven und auch einen höheren Anteil dieser Reserven an der Bilanzsumme auf. Gleiches gilt für Banken mit einer niedrigen regulatorischen Eigenkapitalausstattung und Institute, die bereits stille 340f-Reserven nutzen.
- Öffentlich-rechtliche Banken nutzen 340g-Reserven weniger häufig und in geringerem Maße als andere Institute. Gleiches gilt für Banken mit hohen Risiken im Kreditportfolio, d. h. für Banken mit einem relativ hohen Anteil an notleidenden Krediten.
- Banken mit einem höheren ROA (operatives Ergebnis als Anteil an der Bilanzsumme) bilden 340g-Reserven mit einer höheren Wahrscheinlichkeit und in einem höheren Maße. Gleiches gilt für Institute, die zusätzlich nach IFRS bilanzieren.
- Es kann gezeigt werden, dass sowohl die Wahrscheinlichkeit zur Bildung von 340g-Reserven als auch deren Anteil an der Bilanzsumme im Zeitablauf ansteigen. Diese Aussage gilt auch dann, wenn in Regressionsanalysen für sämtliche anderen wesentlichen Faktoren kontrolliert wird.

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1 Introduction

Banks are considered to be fairly opaque and intransparent institutions compared to many other industries.[1] Insight into and understanding of the banking business is not widespread among the public. Existing bank-specific accounting rules certainly do much to add to this image. These special norms and the consequent lack of transparency in banks' financial reporting are justified by the particular kinds and levels of risk banks are exposed to. Confidence in and the stability of the banking sector are deemed to be vital for the well-being of the world's economies. This becomes even more evident when looking at the turmoil caused by the recent financial crisis. To achieve financial stability and to foster confidence, on the one hand, regulatory bodies impose certain restrictions on the amount of risky assets held by banks in relation to their capital resources.[2] On the other hand, legal bodies generally allow the building of reserves and loss provisions within banks' financial statements.

The German Commercial Code ('HGB') in particular contains two unique but very different instruments permitting banks to build reserves. Firstly, section 340f HGB allows specified financial assets to be deliberately undervalued within certain limits. This is often referred to as creating *hidden reserves* (for simplicity called '340f reserves' hereinafter). Secondly, a bank may increase its visible reserves, so called 'Reserves for General Banking Risks' in accordance with section 340g HGB (for simplicity called 'GBR reserves' hereinafter). These two types of reserves differ greatly with respect to their visibility on the balance sheet. Thus, banks may use them for very different reasons. Whereas the creation of hidden reserves has a very long tradition for German banks, GBR reserves, which are the main focus of this paper, were not introduced into German law until 1993.

340f reserves certainly contribute to the perceived opaqueness of banks, as they undermine the pre- and post-decision information functions of accounting regulations.[3] To some extent, this also holds for GBR reserves. They are visible, but to external observers it is not obvious whether they represent existing risks or whether they were just built as part of the bank's earnings management or as a signaling device. Furthermore, they may also have been built to enhance capital endowment and for internal financing purposes. However, these aims can also partly be achieved by other means, for instance (hidden) 340f reserves, retaining earnings, or by raising new equity.

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1 Cf. Morgan (2002), Flannery et al. (2004), or Ianotta (2006), for example.

2 In this context we refer to the rules of BCBS (2006) (henceforth *Basel II*) which, for instance, have been transformed into German law via the *German Solvency Regulation* since 2007/01/01.

3 For a closer look at the information functions of accounting cf. Beaver/Demski (1979), pp. 43-45.

It is especially interesting to examine the use of GBR reserves, since they were not introduced into German banking legislation voluntarily. Rather, the legislator was forced to do so during adoption of the EC Bank Accounts Directive in 1986, since Germany continued to allow the creation of hidden reserves according to section 340f HGB. We are therefore mainly addressing two research questions in this paper. Firstly, we examine what factors determine the probability of a bank making use of GBR reserves. For this analysis, the level of GBR reserves is therefore irrelevant as long as it exceeds zero. In a second step, we identify key factors that account for the amount of GBR reserves that have been built. To this end, we analyze the evolution of the precise level of this balance sheet item at bank level over time, controlling for the influence of variables such as the category a bank belongs to, its size and other characteristics such as regulatory capital endowment and the level of risk a bank is exposed to. Regulatory constraints as well as concepts focusing on informational asymmetries (such as the Pecking Order Theory) help to provide explanations for our findings and enable us to identify key factors responsible for the use of GBR reserves.

Our empirical analysis is based on a large, unbalanced panel of 4,916 German banks derived from the Deutsche Bundesbank's BAKIS database. It covers the period from 1995 through 2007, yielding a considerable number of bank-year observations (32,023). Our findings are clearly consistent with the predictions implied by information asymmetry outlined above. We see an increase in the use of GBR reserves over time. Furthermore, we can say that GBR reserves are primarily used by large banks, banks with comparatively low regulatory capital endowment, as well as those with lower risks. Furthermore, GBR reserves are used by fairly profitable banks, those reporting according to international financial reporting standards in addition to HGB, and banks which are neither thrifts nor cooperative banks. Finally, we find that banks that make use of hidden reserves according to section 340f HGB also tend to hold GBR reserves.

The remainder of this paper is organized as follows: In Section 2 we review related literature. Section 3 introduces the legal framework, whereas Section 4 presents motives for (not) using GBR reserves. Moreover, the informational perspective on the use of those reserves is evaluated and some practical issues surrounding the decision-making process for building GBR reserves are discussed. Section 5 presents the data set and the results of our empirical analysis. Finally, Section 6 provides some concluding remarks.

2 Related Literature

To the best of our knowledge, no empirical analysis of GBR reserves has been conducted from the perspective of the economics of information. However, risk provisioning in general as well as bank loan-loss accounting in particular have been widely discussed in the past.

Despite major differences between GBR reserves and loan-loss accruals (namely the fact that GBR reserves are, unlike loan-loss accruals, not associated with credit risk), literature on loan-loss provisioning is still most closely related to our analysis. At an **international level**, several papers examine loan-loss provisioning empirically. Madura/McDaniel (1989) as well as Grammatikos/Saunders (1990) analyze the effects of the announcement by Citicorp and other U.S. money-center banks that they would increase loan-loss reserves for third world loans on the stock prices of those banks. They find heterogeneous evidence among the banks. Docking et al. (1997) study differences in the contagion effects of bank loan-loss reserve announcements between money-center and regional banks in the USA for the period from 1985 to 1990. Surprisingly, they find negative announcement effects as well as contagion effects between regional banks. Ahmed et al. (1999) find strong support for loan-loss provisions being used for capital management only. Wall/Koch (2000) review theoretical and empirical evidence on bank loan-loss accounting. To do so, they take very different perspectives on bank regulation and capital management. Laeven/Majnoni (2003) fathom the relationship between loan-loss provisioning and overall economic slowdowns. Recently, Anandarajan et al. (2007) found that Australian banks use loan-loss provisions for capital management.

Another important strand of literature mainly focuses on *earnings management* and its ties to bank loan-loss provisioning. Scheiner (1981) uses data from 107 U.S. banks for the period from 1969 through 1976 but does not detect a correlation between provision allowances and proxies for a bank's good or bad years. By contrast, Greenawalt/Sinkey (1988) find significant evidence for earnings management among U.S. banks. More recently, Bhat (1996), by analyzing a panel of U.S. banks from 1981 through 1991, finds that low-growth banks with a high loans to deposits ratio and high leverage are more likely to carry out income smoothing. Lobo/Yang (2001) analyze bank managers' decisions on discretionary loan-loss provisions to smooth income and to manage capital requirements. Shrieves/Dahl (2003) take a closer look at the use of loan-loss provisions by Japanese banks during a period of financial duress and find evidence for earnings and regulatory capital management. Subsequently, Kanagaretnam et al. (2004) find bank managers using loan-loss provisions as a means of communicating private information about the bank's future prospects. Furthermore, they find this propensity to be greater if a bank is performing badly

and if it is undervalued. Last but not least, Fonseca/González (2008) examine loan-loss provisions as a tool for income smoothing in a cross-country study and find the extent of income smoothing to be lower in countries with effective supervision.

Since sections 340f and 340g HGB are specific German rules, most of the existing papers that deal with these sections merely discuss institutional and legal issues related to the **German banking market** and the underlying accounting system. Shortly after their integration into German banking legislation in 1993, Waschbusch (1994) illustrated the main features of visible reserves. He argues that particularly internationally operating German banks will increasingly use GBR reserves to improve their standing. Following up, Emmerich/Reus (1995) are the first to discuss visible and hidden reserves from a mainly informational perspective, while also showing accounting implications for banks' management in Germany.

Looking at the German banking market, so far only Wagener et al. (1995) have taken an empirical perspective, but that is limited to the year 1993. They study 125 financial statements and 35 group financial statements. However, they do not focus on the use of risk provisions but rather analyze all positions on the banks' balance sheets and profit and loss accounts. With respect to GBR reserves, their focus is on describing how many banks already held such reserves in the year they were first implemented (1993). They do not try to explain their findings using informational aspects as we shall do in the following.

Our paper contributes to the literature in several ways. Firstly, we analyze the financial statements of a panel of 4,739 German banks, the largest sample examined so far. The analysis covers the period from 1995 through 2007, yielding a considerable time series of up to 13 accounting years for each bank. Most importantly, by relating our empirical results to accounting and regulatory properties as well as informational aspects of GBR reserves, we are able to test a number of hypotheses which shed light on some serious agency issues.

3 Legal Framework

The item on the liability side of banks' balance sheets called 'Reserves for General Banking Risks' is a direct consequence of the EC Bank Accounts Directive of 1986, introduced into German law by section 340g HGB in 1993. According to Art. 38 of this directive, members of the EC that continued to allow their banks to build hidden reserves (e.g. Germany through section 340f HGB) had to enable disclosure of GBR reserves as well.[4] The aim was to create a counterweight to the permission to create hidden reserves and thus to increase pressure on banks to turn away from a policy of minimum disclosure.[5]

The creation of hidden reserves has a long tradition in Germany. Though this type of reserves is not the main focus of our paper, an awareness of the major differences as compared to GBR reserves is important for understanding the central arguments set out in the rest of the paper. 340f reserves are formed by deliberately undervaluing loans and certain securities designated the so-called 'liquidity reserve' according to HGB. 340f reserves are referred to as hidden because their use is not apparent from the balance sheet or income statement. The decision to undervalue these assets is in the hands of the bank's management alone. However, 340f reserves are limited to 4% of the overall value of the relevant financial assets before the undervaluation takes place. They have to be eliminated when filing the tax statement, hence they do not influence the bank's tax payments.

Under the leading international financial accounting regimes IAS/IFRS and US-GAAP[6], there is no corresponding rule, i.e. hidden reserves cannot be created in the same way. However, IAS 30.50 - which was still effective until the end of 2006 – allowed the disclosure of reserves for general banking risks.

The funding and release of GBR reserves have to be shown in separate items of banks' income statements. Their variation within one year is visible from the balance sheets and the amount built during a year is shown in the income statement.[7] According to section 340g HGB, the amount of reserves must be 'reasonable'. It is not restricted to any particular level as long as it does not yield negative net income after raising GBR reserves. Similar to 340f reserves, the funding of GBR reserves does not influence tax payments. In a regulatory context, they are treated as tier 1 capital according

[4] For details cf. European Commission (1986).

[5] Cf. for example Bauer (1987), p. 864, and Krumnow et al. (2004), pp. 604f.

[6] For the sake of simplicity, we will, from now on, talk of 'IFRS accounting' when referring to IAS/IFRS or US-GAAP, since if a bank in our sample uses these accounting rules in addition to HGB, the vast majority does so by means of IAS/IFRS accounting.

[7] However, if a bank chooses to convert hidden reserves into visible ones, the conversion does not affect the income statement. In such a case, the level of GBR reserves increases on the balance sheet, while the corresponding item on the income statement remains unchanged.

to section 10 Section 2a of the German Banking Act ('KWG'), while, by contrast, 340f reserves are merely recognized as tier 2 capital. The higher quality of regulatory capital assigned to visible reserves can be regarded as another incentive to increase corporate disclosure.[8]

The decision on whether or not to fund or release GBR reserves is entirely at the discretion of the bank's management. Approval by shareholders is not needed to build GBR reserves. These reserves must not be dedicated to covering the risks arising from certain specified assets. GBR reserves display key features of equity (economically speaking). However, from a purely legal point of view, they have to be reported separately on a bank's balance sheet.

[8] Cf. Krumnow et al. (2004), p. 607.

4 Theoretical Background

4.1 Motives for (Not) Using GBR Reserves

Since the aim of financial accounting is to provide information, we adopt the information content approach in this paper.[9] Clearly, information given via financial statements can be useful in a pre- and a post-decision manner. On the one hand, disclosure of accounting information will help potential investors and depositors when coming to an investment decision (pre-decision information function). On the other hand, financial accounting helps mitigate agency problems between bank managers and existing investors (post-decision information function). Informational aspects play a leading role in understanding why management may prefer to build GBR reserves rather than using other instruments that fulfill similar functions. Since bank managers are the ones to choose, we will predominantly take their perspective as the basis for our evaluation.

Most intuitively, GBR reserves are a means of **risk provisioning** and **internal capital accumulation** to cover general banking risks. German banks can also achieve these aims by creating hidden 340f reserves or by retaining earnings. At least theoretically, raising new equity may be a third alternative to cover unforeseen risks.

As they are hidden, 340f reserves may help hide a bad signal from potential investors.[10] As a result of informational asymmetries between investors and the bank's management, increasing visible GBR reserves may be regarded as evidence of a risen risk level at the bank. For short, we will refer to this as the 'bad risk signal' below. In other words, building visible reserves may lead to a loss of confidence in the bank's economic prosperity. Hence, potential capital suppliers may refrain from investing in the company. However, this bad signaling effect is likely to vanish over time as more and more banks use GBR reserves.

In addition, it is important to note that the bad risk signal is of different relevance for different types of institution. Firstly, money-center banks are not exposed to this signaling effect to the same extent as smaller ones. This is because the economic well-being of large banks is assumed to have a huge impact on the stability of the whole financial system. Bankruptcy or illiquidity of such an institution is likely to cause severe uncertainty regarding the safety of bank deposits. Therefore, money-center banks are often held to be 'Too Big To Fail' (TBTF), since governmental

[9] Cf. Christensen/Demski (2003), pp. 3-6.

[10] Disregarding all informational considerations for a moment, the existing limit on the amount of 340f reserves (to 4% of the valuation basis) may present a material drawback with respect to all functions. Confidential statements from practitioners, however, suggest that this is not really a binding restriction.

institutions are supposed to support ailing banks to avoid financial instability.[11] Secondly, banks subject to public law (for simplicity also called 'public banks' hereinafter), e.g. thrifts as well as federal and state banks, may also not be exposed to this bad signal to the same extent as privately owned banks. Maintenance obligation ('Anstaltslast') and guarantee obligation ('Gewaehrtraegerhaftung') formerly in place in Germany basically eliminated all likelihood of such banks becoming bankrupt or illiquid. Maintenance and guarantee obligations, which had been an important characteristic of the German banking market for a long time, had to be abolished in 2005 because they did not comply with European competition regulations. However, the consequences for the risk provisioning signal effects are still in place, especially because debt issued before 2005 is still protected.

Retaining earnings also serves the risk provisioning function. In terms of the decision-making process within the bank, managers may, however, prefer to increase GBR reserves. Shareholders' or owners' approval is essential for retaining earnings and also for releasing them. Managers intending to use earnings to cover general banking risks cannot be certain that the owners will not choose to distribute them. Consequently, they may prefer to use their discretionary powers to build visible or hidden reserves instead. In other words, building these reserves deprives owners of their right to decide on the appropriation of what would otherwise become the bank's equity. Since investors may anticipate this behavior, increasing GBR reserves may represent a bad signal stemming from informational asymmetries. Building reserves may indicate that bank managers are uncertain of obtaining shareholders' approval for retaining earnings, since there may be more profitable investment alternatives (with a similar risk level). If so, the owners will try to extract money by claiming a higher dividend. Due to their informational head start, the insiders' conceivable skepticism about the bank's prospects can be seen as a bad signal to outside investors. In the following, we will refer to this as a bad 'management signal' for short. Based on insiders' behavior, other capital market participants may be reluctant to invest money in the company. Nevertheless, this bad signal may also disappear over time with the increasing use of GBR reserves. Like the bad risk signal outlined above, this bad signal is also much less relevant for banks subject to public law. Their specific ownership structure, with municipal and state authorities as owners, makes them virtually independent of equity markets. There is no need to attract new shareholders and mechanisms of stock market valuation do not apply to this type of bank. Their owners, too, may prefer to have more rather than less profits available for redistribution.

[11] For more details on first evidence for TBTF policy used by the Federal Deposit Insurance Corporation (FDIC) in the 1980s, cf. FDIC (1997), pp. 235-257. The more recent failure of Lehman Brothers may have been intended to demonstrate that TBTF does not hold. The disruptions following the default, however, were such that governments all over the world officially acknowledged TBTF by assuring they would rescue any bank relevant to the financial system.

The theory of corporate control comes into play here. It is well proven that companies with only a few (possibly large and influential) owners are monitored more closely than companies featuring a disperse ownership structure.[12] Monitoring helps to reduce informational asymmetries between a bank's management and its shareholders. In Germany, banks subject to public law (mainly thrifts and federal state banks) are usually owned by a small number of cities or municipalities, whereas ownership of private and especially incorporated banks is usually widespread. Managers of closely monitored banks may prefer to make use of hidden 340f reserves rather than the visible alternative to avoid the bad management signal and prevent shareholders from demanding the distribution of profits. Combining this line of argument with the ones for the risk and the management signal yields conflicting predictions in terms of the choice between visible and hidden reserves for banks subject to public law. On the one hand, they may not be exposed to the bad risk and the bad management signal and therefore make use of GBR reserves. On the other hand, their managers may be closely monitored, resulting in the primary use of hidden 340f reserves. The question as to which of these two effects outweighs the other will be the subject of our empirical analysis in Section 5.

In terms of raising new equity as a means of risk provisioning, the main conclusions of the Pecking Order Theory developed by Myers (1984) and Myers/Majluf (1984) have to be taken into account. In short, companies prefer internal finance to debt and equity issuance. Once more, the basis for this theory are informational asymmetries between the management of and potential investors in a company. If managers believe a company to be undervalued, they will not raise new equity for financing purposes because investors will need to pay less than the company is worth. Conversely, managers who believe that their company is overvalued will likely issue stock since investors will pay more than the company's value. Thus, the attempt to sell stock typically shows that a company is overvalued. Therefore issuing equity sends a worse signal about the managers' beliefs to capital markets than raising funds internally. This may result in managers' preference for increasing GBR or 340f reserves or retaining earnings rather than issuing equity.

Besides risk provisioning, increasing GBR reserves can also be used as a way of internal **financing** and **cash flow management**. The level of earnings available for distribution to owners (dividends, say) is lowered by building reserves. Thus, free cash flow does not leave the bank but is instead at management's disposal for financing new projects.[13] Creating 340f reserves may again be a wise alternative to using GBR reserves from the management's point of view, since doing so will not

[12] Cf. Levine (2004), who comments on special features of corporate governance in banks.

[13] Cf. Christensen/Demski (2003), pp. 125-126 for the information content of cash flows and pp. 35-45 for their impact on a firm's value.

send a bad risk or management signal to capital markets. This line of argument also holds for retaining earnings, which likewise avoids conflicts in closely monitored banks. However, in this case, management cannot decide about the development of retained earnings and therefore has to convince shareholders to supply funds.

A bank's management may also decide to deliberately use GBR reserves as a **signaling device** to reduce any informational asymmetries between themselves and the bank's owners or depositors. Building these reserves shows that the bank is in a economically strong position and that it is generating sufficient profits to build GBR reserves. We will from now on refer to this as the 'signal of strength' for short. This interpretation of course runs counter to the effect, outlined above, whereby GBR reserves act as a bad risk signal. Which of the two effects outweighs the other is the subject of our empirical analysis. The signal of strength may even be intensified by achieving a constant rise in GBR reserves as shown on the balance sheet over time. Confidential statements from practitioners indeed prove this to be an important motive for which the profitability of a bank is certainly a key factor.

In terms of use as a signaling device, retaining earnings is the only valuable alternative to building GBR reserves. It shows that the bank is generating sufficient profits and is in good shape. Boosting the equity ratio by retaining earnings avoids the bad risk signal incurred by funding GBR reserves.

Creating hidden 340f reserves is not an alternative in this context, since their level is not visible to external observers and capital markets. Banks are, of course, free to disclose the volume of hidden reserves they hold within the notes to the financial statement. However, hardly any bank does so. Issuing new equity – if deemed to have any signaling effect at all in this context – is fairly counterproductive. According to Pecking Order Theory, issuing new equity is a clear sign that management believes the company to be overvalued. Such an overvaluation may stem from capital markets overestimating the bank's future earnings potential. Therefore, the wish to raise new equity will certainly reveal this error of judgment.

Any kind of reserves may be used as a tool for **earnings management**. Bank managers often aim at assuring their stockholders a stable or – preferably – a slightly growing annual dividend. An increase in the regular annual dividend is usually interpreted by investors as a sign of management's confidence in future earnings prospects. Therefore, stock prices and the company's value are likely to rise following an increase in dividends.[14] Obviously, this motive is closely connected to the aforementioned use of GBR reserves as a signaling device.

[14] For further details, cf. the basic dividend model developed by Lintner (1956) and further research by Healy/Palepu (1988) as well as Benartzi et al. (1997).

In terms of earnings management, the only reasonable alternative to creating GBR reserves is to use hidden 340f reserves. In years of economic well-being, profits will suffice to distribute stable or slightly growing dividends. At the same time, bank management may deliberately undervalue assets within the given limits (according to section 340f HGB). These undervaluations can be reversed in economically bad periods to achieve dividend stability. Again, the bad management signal may be avoided by using 340f rather than GBR reserves. Using retained earnings influences declared profits rather than net income and is thus inappropriate for earnings management purposes. Raising new equity does not have any impact at all in this context.

Having introduced some aspects that are mainly driven by informational asymmetries, some practical issues potentially driving the use of GBR reserves must not be disregarded. Most closely connected to the aforementioned risk provisioning is a bank's need to enhance its **regulatory capital endowment**. Under Basel II and the German Solvency Regulation, banks have to hold a certain amount of capital in relation to their risk-weighted assets. GBR reserves are acknowledged as tier 1 capital and can therefore help eliminate regulatory capital shortages.

With respect to boosting the tier 1 capital endowment, retaining earnings and raising new equity are equivalent options to an increase in GBR reserves. A bank may also influence its regulatory capital endowment by reducing its risk-weighted assets, of course. However, we ignore this because it is related to changes on the asset side of the balance sheet, which we are not looking at. With respect to tier 1 capital endowment, 340f reserves are not equivalent because they are recognized as tier 2 capital only.

Achieving an increase in a bank's tier 1 capital endowment by retaining earnings avoids both bad signals described above stemming from a rise in GBR reserves. Another alternative is to raise new equity. However, the line of argument concerning the Pecking Order Theory (as mentioned before) holds here, too.

Moreover, the obligation to disclose hidden 340f reserves when preparing **financial statements according to IFRS** in addition to HGB (we will henceforth simply call such banks 'IFRS banks') may be another motive for using GBR reserves. Whereas building hidden reserves is explicitly allowed under HGB accounting, IFRS prohibit this. Consequently, if a German bank wishes or has to prepare its (group) financial statements according to IFRS, it must disclose its former 340f reserves. Doing so in its HGB unconsolidated financial statements as well may then be beneficial for two reasons. Hidden reserves are revealed within the IFRS accounts, so they partly lose their latent characteristics anyway. However, it is unclear whether the extent of hidden reserves becomes fully evident when transferring HGB accounts to IFRS

due to the different categories of financial instruments and the different valuation rules. Nevertheless, we deem this aspect to be important. Furthermore, getting rid of hidden reserves is one step towards eliminating costly parallel book keeping.

The bank may also decide to disclose hidden reserves by putting these funds into retained earnings rather than increasing GBR reserves. Showing these disclosed reserves as profits and distributing them to the owners of the bank is another option for management. Since this distribution serves neither financing nor risk provisioning purposes, it will not be discussed in any further detail.

Table 1 summarizes the most important results of our theoretical considerations.

	GBR reserves	**340f reserves**	**retained earnings**	**new equity**
risk provisioning	visible	invisible	visible	
financing	no capital outflow			capital inflow
earnings management	visible	invisible	n/a	
regulatory capital	tier 1	tier 2	tier 1	
use in IFRS	possible	n/a	possible	n/a
decision-making	by management		by shareholders	
signals	bad risk and management signals, good signal of strength	none	good signal of strength	bad signal according to Pecking Order Theory

Table 1: Evaluation of GBR reserves and the alternatives.

4.2 Hypotheses

Starting from theoretical considerations, we arrive at the following hypotheses. To simplify and enhance understandability, we will phrase the hypotheses in an economically rather than a statistically correct manner.

*H 1: The **size** of a bank has a positive impact on the management's decision to use GBR reserves.*

This hypothesis refers to the fact that the bad risk signal from using GBR reserves may not be as important for money-center banks as for smaller institutions. When a large bank experiences financial distress, intervention by government authorities is very likely according to the TBTF theory.

*H 2: Being a bank **subject to public law** has an impact on the use of GBR reserves.*

The particular ownership structure of public banks makes them less vulnerable to either of the two bad signals caused by GBR reserves. However, the fact that banks subject to public law are usually owned by a small number of cities or municipalities means these banks are subject to a higher level of monitoring. Consequently, their management may decide to use hidden 340f rather than GBR reserves as outlined above. Which of those two effects outweighs the other is the subject of our empirical analysis.

*H 3: The use of GBR reserves increases over **time**.*

The more banks use visible reserves, the more the bad risk signal as well as the bad management signal will diminish. So we expect to see a continuous rise in the number of banks using GBR reserves as well as in the aggregate size of GBR reserves for all banks from 1995 through 2007.

*H 4: The **risk level** of a bank has an impact on the decision to use GBR reserves.*

Since GBR reserves are meant to prevent general banking risks, a bank's risk level will presumably have an impact on their use. Hence, we expect to see a positive correlation. By contrast, high-risk banks may be in such financial distress that they cannot fund reserves. Accordingly, we cannot hypothesize in advance whether a high risk level has a positive or a negative impact on the management's decision to fund GBR reserves.

*H 5: The **regulatory capital** endowment has a negative impact on the use of GBR reserves.*

Under the German Banking Act, GBR reserves are recognized as tier 1 capital. Therefore, banks that are short of regulatory capital may prefer to build GBR rather than 340f reserves.

*H 6: Being a bank that publishes its statements according to **IFRS** as well as HGB ('IFRS banks') has a positive impact on the use of GBR reserves.*

IFRS accounting does not allow for hidden reserves to be built as under section 340f HGB. Therefore, we would expect IFRS banks to convert hidden reserves into the visible alternative upfront, and we anticipate a strong correlation between the use of GBR reserves and preparing financial statements according to IFRS.

*H 7: The **profitability** of a bank has a positive impact on the decision to use GBR reserves.*

This hypothesis is closely connected to the use of GBR reserves as a signal of strength. To be able to fund GBR reserves, a bank has to be fairly profitable. There-

fore, we should see a bank's profitability having a positive influence on its likelihood of using GBR reserves and the extent to which it does so. One is tempted to interpret this hypothesis in a way that assumes that GBR reserves will be used for earnings management purposes. Since the corresponding coefficient in our regressions would have the same sign if this were the case, it is not clear which of the two effects is responsible. However, the analysis of earnings management behavior is the subject of further research.

5 Empirical Analysis

5.1 Data and Variables

For our empirical analysis, we use data from the Bundesbank's prudential database BAKIS (BAKred Information System) for the years 1995 through 2007. BAKIS is the information system on bank-specific data which is jointly operated by the Deutsche Bundesbank and the German Financial Supervisory Authority (BaFin). The database contains information on the financial statements and supervisory reports of individual German banks. Therefore, our analysis is based on a micro panel of annual supervisory bank-level data for 4,916 German banks.[15] We merely analyze unconsolidated accounts prepared according to HGB, since building GBR reserves is not allowed within financial statements prepared according to any international accounting regime.

In some parts of our analyses, we divide the German banking market into four different categories according to bank size and legal status: Savings banks (*henceforth: Thrifts*), cooperative banks (*Coops*), small private banks (henceforth: *Small Credits*), and large banks (*Large Banks*). The latter category contains the five largest German private banks as well as the federal state banks and the central institutions of the cooperative banking sector. We are aware of the fact that this categorization is somewhat unusual since German banks are commonly grouped merely according to their legal status into savings banks, cooperative banks and private banks. However, we assume that much of banking institutions' behavior is mainly driven by their size rather than their legal status.

We deliberately excluded other types of financial institutions like home loan banks, mortgage banks or securities trading banks since they either do not fulfill the definition of a bank according to section 1 KWG or they do not conduct core banking businesses such as lending and borrowing. Owing to a lack of data and mergers during the observed time period, the panel is unbalanced and consists of 32,023 bank-year observations.

It is noteworthy that coverage (meaning the proportion of banks included in our panel in relation to the overall number of banks in Germany) is always close to and mostly exceeds 90% for each bank category in each year. For *Thrifts* and *Small Credits*, we do achieve coverage of 100% at least for 2005, as shown in Table 2.

[15] Due to our treatment of mergers, this figure is higher than the actual number of existing banks. In case of a merger, we, technically speaking, created a new bank that is independent of the merging ones. This new bank starts operating in the year of the merger. For the purposes of our analysis, there is no need to distinguish between mergers, takeovers or any other kind of acquisition.

Year	Thrifts	Coops	Small Credits	Large Banks
1995	98.9	97.2	94.9	90.9
2000	99.5	98.2	89.0	86.4
2005	100.0	98.4	89.9	89.5

Table 2: Coverage by bank groups for selected years (in %).

	Thrifts		Coops		Small Credits		Large Banks		Total	
Year	No.	row%	No.	row%	No.	row%	No.	row%	No.	row%
1995	619	18.5	2,519	75.3	188	5.6	20	0.6	3,346	100.0
1996	606	18.6	2,448	75.3	178	5.5	21	0.7	3,253	100.0
1997	594	18.7	2,364	74.6	191	6.0	20	0.6	3,169	100.0
1998	589	19.7	2,197	73.5	183	6.1	20	0.7	2,989	100.0
1999	575	20.8	1,992	72.1	177	6.4	20	0.7	2,764	100.0
2000	559	22.2	1,760	69.9	178	7.1	20	0.8	2,517	100.0
2001	535	23.0	1,597	68.8	171	7.4	19	0.8	2,322	100.0
2002	517	23.9	1,462	67.5	167	7.7	20	0.9	2,166	100.0
2003	488	23.9	1,375	67.4	159	7.8	19	0.9	2,041	100.0
2004	476	24.2	1,317	67.0	154	7.8	18	0.9	1,965	100.0
2005	463	24.4	1,273	67.2	142	7.5	17	0.9	1,895	100.0
2006	454	24.7	1,234	67.0	135	7.3	18	1.0	1,841	100.0
2007	427	24.3	1,189	67.8	122	7.0	17	1.0	1,755	100.0
Total	**6,902**	**21.6**	**22,727**	**71.0**	**2,145**	**6.7**	**249**	**0.8**	**32,023**	**100.0**

Table 3: Number of observations in the panel by bank categories over time.

Table 3 gives detailed information on the number of banks observed in our panel and the split between the bank categories over time. The share of each bank category is fairly constant over time, whereas the absolute number of banks decreases (almost) steadily, reflecting mergers that have occurred in the German banking sector in the last decade. *Coops* dominate our sample. They have a share of roughly 71%, followed by *Thrifts* (22%), *Small Credits* (7%), and *Large Banks* with about 1%.

We apply the following variables to measure the use of **GBR reserves**: $GBR_{i,t}$ is the amount of GBR reserves of bank i in year t and $GBR^{TA}_{i,t}$ is the share of GBR reserves in relation to total assets of bank i in year t. The binary variable $D\_GBR_{i,t}$ takes the value 1 if bank i shows a positive amount of GBR reserves in year t (thus $GBR_{i,t} > 0$) and 0 otherwise.

Regarding *H1*, we use $SIZE_{i,t}$ as a proxy for the **size** of the bank, which is measured as the natural logarithm of total assets of bank i in year t. To prevent endogeneity, we exclude the amount of GBR reserves included in a bank's total assets.

With respect to *H2*, D_PUBLIC_i is 1 if bank i is **subject to public law** and 0 otherwise. This variable is constant over time because changes in legal status did not occur.

Referring to *H3*, we are including time dummy variables τ_t. Hence, we can control for changes in GBR reserves during the course of our analysis and find time-fixed effects.

To account for banks' individual **risk** levels (corresponding to *H4*), we use the non-performing loan ratio of a bank i in year t and name it $NPL_{i,t}$. The choice of this proxy is based on the assumption that banks with a high NPL ratio are also exposed to generally high risk levels. It is calculated as the ratio of non-performing to total customer loans. Loans are non-performing if the bank is waiting for payments which are overdue by at least 90 days.[16]

To somehow control for banks using GBR reserves as a signal of strength, we finally include $D\_340f_{i,t}$, a dummy variable which takes the value 1 if a bank is using any hidden **340f reserves** and 0 otherwise. If a bank is able to fund both types of reserves, it is likely in a strong economic position, and one way of showing this is by means of GBR reserves.

To analyze the endowment with regulatory capital (relevant to *H5*), we use the level of **tier 1 capital** a bank has in relation to its risk-weighted assets. Once more to prevent endogeneity when examining the influence of the tier 1 capital endowment, we exclude the volume of GBR reserves inherent in tier 1 capital. The corresponding variable is named $TIER1_{i,t}$.

The dummy $D\_IFRS_{i,t}$ is used for *H6*, t. It takes the value 1 if bank i in year t prepares its (group) financial statements according to **IFRS** in addition to HGB and 0 otherwise. Note that this dummy is time-variant because many banks changed their status from 'non-IFRS' to 'IFRS' (but not the other way round) during the period of our analysis.

Finally, we use $ROA_{i,t}$, which is the return on assets (ROA) of bank i in year t, as a proxy for the **profitability** of a bank. With respect to *H7*, it is calculated as the ratio of operating income (income before risk provisioning) to total assets of bank i in year t. Using operating income rather than net income or declared profits eliminates any effects stemming from legal accounting policy on the one hand or manipulation on the other hand.

A relatively moderate outlier treatment is applied to the dataset, in which we truncate explanatory variables (except for dummy variables) at the 0.5% and 99.5% quantile. To account for the heterogeneity of the capital adequacy ratio (tier 1

[16] For technical reasons, the numerator of this ratio, on top of troubled customer loans also comprises non-performing interbank lending, whereas the denominator merely contains the sum of a bank's customer loans. Thus, the NPL ratios may be overstated to a certain extent. However, since the volume of troubled interbank loans has generally been low, at least before the start of the financial crisis, this should be negligible.

Category	No. of banks	TA in EUR 1,000	*D_PUBLIC* (in %)	*D_IFRS* (in %)	*D_340f* (in %)	*TIER1* (in %)	*NPL* (in %)	*ROA* (in %)
Thrifts	762	1,745,338	98.7	0.1	98.6	7.8	3.9	0.7
Coops	3,633	303,811	0.0	0.0	95.2	8.5	5.2	0.7
Small Credits	311	2,863,477	0.0	5.3	42.4	11.2	6.5	0.7
Large Banks	33	70,512,546	60.6	28.5	91.2	7.5	2.6	0.22
Total	**4,916**	**1,331,881**	**21.7**	**0.6**	**92.4**	**8.5**	**5.0**	**0.7**

Table 4: Number of banks and mean of observations in the panel by category.

capital of a bank in relation to its risk-weighted assets), we use an upper-bound truncation of this variable at the 97% quantile.

Table 4 shows the number of banks per category as well as averages per category and across all banks for these variables. Since the table shows the mean of observations and not the mean of banks, those banks with many observations in the panel have a higher weight than banks which contribute only a few observations. The quite low average of total assets for all banks is the result of the dominance of Coops in the sample. Generally speaking, correlation is low and multicollinearity is therefore not a serious problem. Table 5 reports the correlation coefficients for the variables in our analysis.

Variables	*D_GBR*	GBR^{TA}	*SIZE*	*D_PUBLIC*	*D_IFRS*	*D_340f*	*TIER1*	*NPL*
D_GBR	1.0000							
GBR^{TA}	0.6582	1.0000						
SIZE	0.1893	0.0652	1.0000					
D_PUBLIC	0.0316	-0.0097	0.5303	1.0000				
D_IFRS	0.1319	0.0360	0.2212	-0.0208	1.0000			
D_340f	0.0403	0.0371	0.0001	0.1234	-0.0839	1.0000		
TIER1	0.0228	0.0578	-0.1993	-0.1502	0.0129	-0.1499	1.0000	
NPL	-0.0996	-0.0553	-0.1120	-0.1353	-0.0513	-0.3002	0.0199	1.0000
ROA	0.0021	0.0292	-0.0802	-0.0289	-0.0386	0.1903	0.1193	-0.2610

Table 5: Pairwise correlations.

5.2 Results

5.2.1 Descriptive Statistics

First of all, we compute the share of banks holding a positive volume of GBR reserves with the help of the mean of *D_GBR*[17]. For *Thrifts*, Figure 1 shows that this share slowly increased until 2000, followed by a steeper rise in recent years (reaching 34% in 2007). For *Coops*, a similar, even more pronounced development is characterized by a rapid increase in 2003, 2006 and 2007. The share of *Coops* using GBR reserves has doubled from 2005 to 2007, ultimately reaching 43%. The share of *Small Credits* showing GBR reserves increased slightly in the years from 1995 through 2001 and fluctuated between 10% and 17% until 2007.

The *Large Banks* take the lead in the use of GBR reserves, starting at a share of about 30% in 1995, and fluctuating between 70% and 83% until 2007. When looking at these numbers, it has to be considered that the overall number of banks within this category is fairly small. Since federal or state banks (being large and public) as well as large cooperative central and the largest German private banks are included in this category, our findings are in line with hypothesis *H1* (size). This is true for the initially hesitant use of GBR reserves within *Thrifts* and *Coops* and the low share of usage within *Small Credits* as well, since these groups primarily consist of smaller banks. Further confirmation is provided by the correlation coefficients for *D_GBR* and *SIZE* in Table 5.

With respect to *H2* (public), our findings indicate that the extent of monitoring and corporate control lowers the use of GBR reserves, since almost all banks subject to public law are *Thrifts* and largely did not make use of GBR reserves, at least in the early years of our analysis. The conflicting (since positive) sign of the correlation coefficient of *D_PUBLIC* with *D_GBR* (as given in Table 5) calls for a deeper analysis regarding the dummy for banks subject to public law, as we outline in the next section.

The share of banks using GBR reserves within the banking sector as a whole rose steadily from 0.8% in 1995 to 39.2% in 2007. Bearing in mind that *Thrifts* and *Coops* dominate our sample, Figure 1 clearly exhibits this rise. This confirms our hypothesis regarding time, *H3*.

To gain deeper insight into the use of GBR reserves, we counted the number of activities involving these reserves over time (cf. Table 6). The second column *First year*

[17] To improve readability, we will from now on neglect the sub indices i and t.

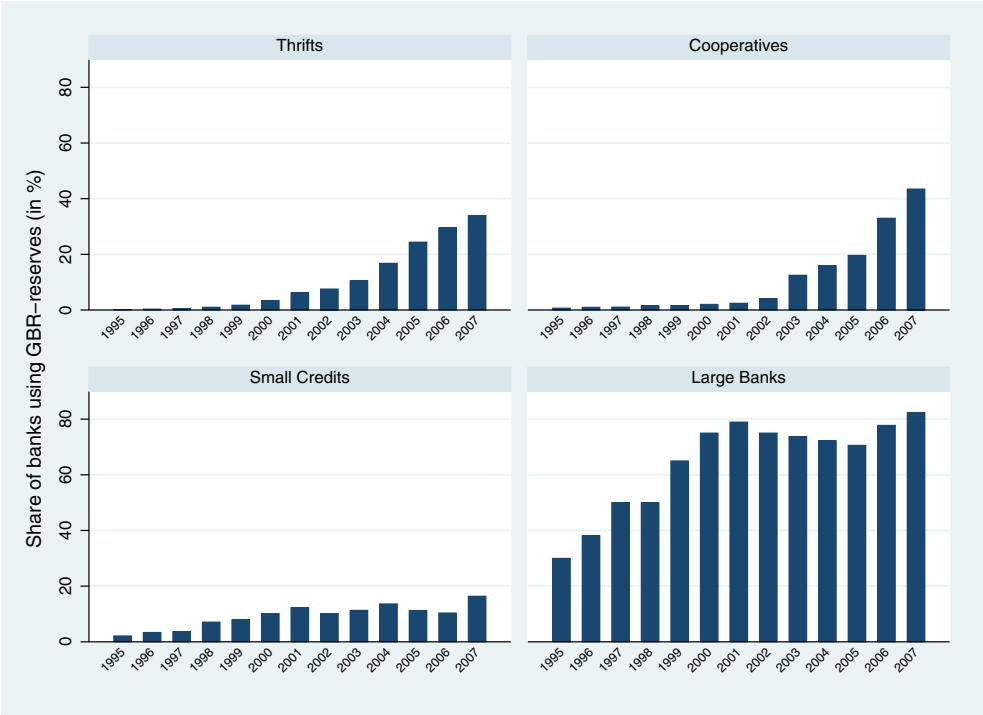

Figure 1: Share of banks using GBR reserves per bank category over time.

is a fairly technical one listing observations for which we cannot clearly identify the activity as data for the previous period is lacking. Furthermore, we distinguished between first-time implementation (*Implement*), an increase (*Raise*), a constant level of zero (*Hold at zero*), a constant level above zero (*Hold above zero*), a decrease to a still positive level (*Reduce*), and a termination of the whole balance sheet item (*Terminate*). Apparently, an existing level is increased much more often than lowered. Similarly, we observed substantially more implementations than terminations. Supporting *H3* (time), the number of implementations clearly increases over time, including a sudden rise in 2003.

In this paragraph, we will exclusively focus on those observations where banks use GBR reserves and on the question of what level of reserves those banks hold.[18] To eliminate size effects, we use the ratio of GBR reserves to total assets GBR^{TA}. Figure 2 shows how this ratio has evolved over time, broken down by bank category. It reveals startling results especially for *Small Credits*. The ratio of GBR reserves to total assets is remarkably high in 1995 and falls to a lower level afterwards. Once more, a steep rise is visible during 2001 and 2002 followed by a sharp decline to a fairly constant level of roughly 0.5% of total assets. When interpreting these findings, the small number of banks showing these reserves within this group has to

[18] Technically speaking, we are neglecting all observations with $D\_GBR_{i,t} = 0$, i.e. we take a bank into account only in those years in which its level of GBR reserves is positive.

Year	First year	Imple-ment	Raise	Hold (= 0)	Hold (> 0)	Reduce	Terminate	Total
1995	3,346	0	0	0	0	0	0	3,346
1996	153	12	13	3,062	12	0	1	3,253
1997	125	6	8	2,974	25	1	30	3,169
1998	179	20	12	2,727	23	1	27	2,989
1999	205	14	17	2,473	26	0	29	2,764
2000	228	24	28	2,193	24	2	18	2,517
2001	185	31	28	2,013	43	1	21	2,322
2002	140	27	51	1,887	43	4	14	2,166
2003	134	120	64	1,659	46	3	15	2,041
2004	75	70	117	1,571	119	3	10	1,965
2005	65	76	170	1,447	120	4	13	1,895
2006	45	176	234	1,239	134	7	6	1,841
2007	36	154	345	1,028	171	5	16	1,755
Total	**4,916**	**730**	**1,087**	**24,273**	**786**	**31**	**200**	**32,023**

Table 6: Number of activities involving GBR reserves over time.

be considered. Thus, the results are driven by very few institutions. For *Thrifts*, a steady increase is visible for the years from 1997 onwards. This is generally true for *Large Banks* as well as *Coops*. However, the latter display sudden rises in 2000 and 2006.

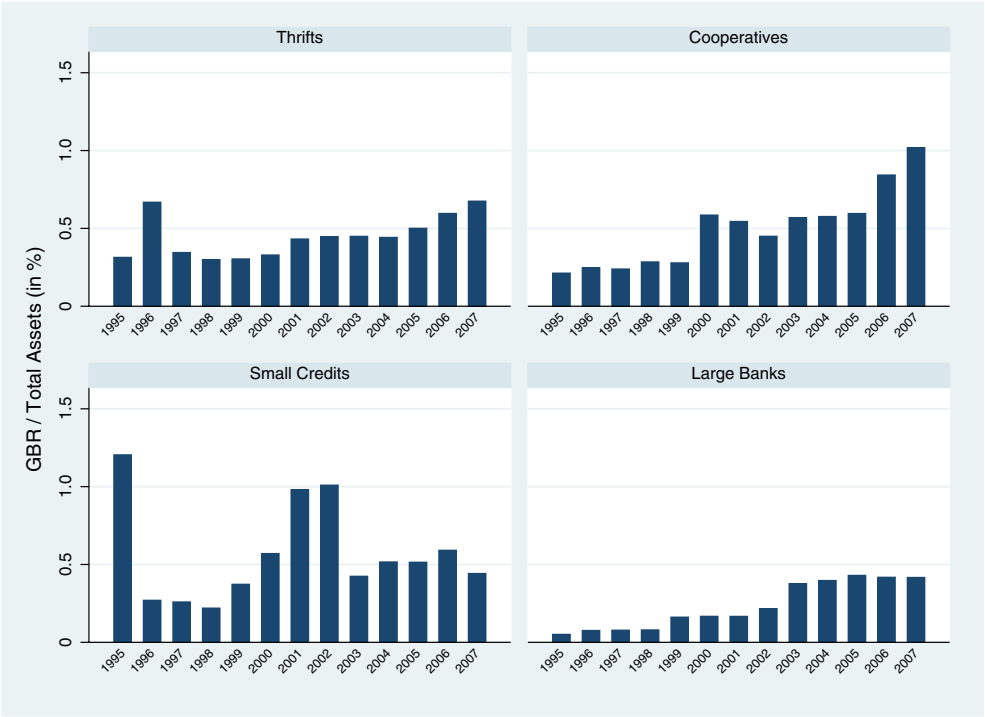

Figure 2: GBR^{TA} by bank category over time.

5.2.2 Regression Models

Addressing the first of our research questions, relating to the factors driving the probability of a bank making use of GBR reserves, it is helpful to estimate probit models using *D_GBR* as the dependent variable. This is done in *Model A.1*, where we examine the influence of the independent variables *SIZE* (referring to hypothesis *H1*), *D_PUBLIC* (*H2*), *NPL* (*H4*), *D_340f* (indirectly related to *H7*), *TIER1* (*H5*), *D_IFRS* (*H6*) and *ROA* (*H7*) on the probability that a bank will use GBR reserves. Moreover, we include the time dummies (τ_t) to find time-fixed effects (referring to *H3*). Since we do not control for any unobservable random or bank-fixed effects, it is simply a pooled time-fixed effects estimation. The formal design of *Model A.1* is given in equation (1):

$$\begin{aligned} P(D\_GBR_{i,t} = 1) \quad &= \beta_0 + \beta_1 \cdot SIZE_{i,t} + \beta_2 \cdot D\_PUBLIC_i + \beta_3 \cdot NPL_{i,t} \\ &+ \beta_4 \cdot TIER1_{i,t} + \beta_5 \cdot D\_340f_{i,t} + \beta_6 \cdot D\_IFRS_{i,t} \\ &+ \beta_7 \cdot ROA_{i,t} + \textstyle\sum_{t=1}^{11} [\beta_{(10+t)} \cdot \tau_{(1995+t)}]. \end{aligned} \tag{1}$$

The estimated coefficients as well as the corresponding standard errors (in brackets) are shown in the second column of Table 7. Additionally, the AUR value as well as the number of observations with $D\_GBR = 0$ are given at the bottom.[19]

With respect to the second research question, we investigate which factors are responsible for the precise level of GBR reserves a bank's management chooses to hold. To this end, we employ a tobit model (*Model A.2*) with GBR^{TA} as the dependent variable. The tobit methodology[20] accounts for the fact that the level of GBR reserves is naturally truncated at zero. Ignoring this and using OLS regression models, which allow for negative values of the dependent variable, would systematically underestimate the slope of the regression line. We are using the same set of independent variables as in Model A.1 and again pooling the data while controlling for time-fixed effects. The formal design of *Model A.2* is given in equation (2):

[19] To assess the fit of the overall Model A.1, we calculate the AUR value, which equals the area under the so-called Receiver Operating Characteristic Curve. For a more detailed description of ROC curve analysis cf. Flach et al. (2003) and Fawcett (2006). In our case, the AUR value measures the ability of the model to correctly identify those banks using GBR reserves (thus having $D\_GBR_{i,t} = 1$) and those not using them. The larger the AUR value (equaling the area under the ROC curve), the more accurate the model in question is. The corresponding AUR value of roughly 86% means that our model has excellent accuracy.

[20] For further details cf. Tobin (1958).

$$GBR_{i,t}^{TA} = \begin{cases} Y_{i,t} & \text{if } Y_{i,t} > 0 \\ 0 & \text{if } Y_{i,t} \leq 0 \end{cases}$$

$$\begin{aligned} Y_{i,t} &= \beta_0 + \beta_1 \cdot SIZE_{i,t} + \beta_2 \cdot D\_PUBLIC_i + \beta_3 \cdot NPL_{i,t} \\ &+ \beta_4 \cdot TIER1_{i,t} + \beta_5 \cdot D\_340f_{i,t} + \beta_6 \cdot D\_IFRS_{i,t} \\ &+ \beta_7 \cdot ROA_{i,t} + \textstyle\sum_{t=1}^{11} [\beta_{(10+t)} \cdot \tau_{(1995+t)}] + \epsilon_{i,t}. \end{aligned} \tag{2}$$

The estimated coefficients as well as the corresponding standard errors (in brackets) are shown in the third column of Table 7. Additionally, $\bar{R}^2_{pseudo}$ and the number of observations with $GBR^{TA} = 0$ are given at the bottom.

In order to test whether an independent variable has an impact on D_GBR (GBR^{TA} respectively), i.e. the corresponding β is non-zero, we should be able to reject the null hypothesis of $\beta = 0$ at a preferably high level of significance.[21] Broadly speaking, the results of both analyses are identical (with respect to the sign of the coefficients). Therefore, we conclude that the variables driving the probability of using GBR reserves also influence the level of GBR^{TA}.[22]

As expected, we find a strongly significant positive influence of the variable *SIZE*, i.e. $\beta_1 > 0$, which means that large banks tend to use GBR reserves more often than small banks and show a higher level. Once more, our (economic) hypothesis *H1* is confirmed.

Because $\beta_2 < 0$, the dummy variable D_PUBLIC apparently has a negative and significant influence on the probability of a bank making use of GBR reserves. In other words, if a bank is subject to public law, it is less likely to use visible reserves than if it is privately owned. Therefore, *H2* is also confirmed.[23] The effect of a close monitoring of the management in banks subject to public law (suggesting that those banks' managers will not make use of GBR reserves) obviously outweighs the lines of argument relating to both the risk and the management signal (suggesting that

[21] In the following, we say for short that the independent variable has a *significantly positive impact* on the dependent variable, meaning that the corresponding coefficient has a positive sign and significantly differs from 0 according to the t-test.

[22] This proves that the choice of the tobit model is appropriate in our setting. If different variables influenced the likelihood of the use of GBR reserves and the level of GBR^{TA}, results would be different in those two model types. A Heckman approach would then be adequate for modeling our research questions correctly.

[23] At first sight, this result contradicts the positive correlation coefficient between D_PUBLIC and D_GBR (as given in Table 5). However, this may be owing to the considerable positive correlation between D_PUBLIC and *SIZE*. In other words, the fact that large banks are usually more likely to use GBR reserves and that, at the same time, public banks are fairly large may cause this correlation which more than compensates for the negative effect of D_PUBLIC on D_GBR.

Control variables	SIZE & D_PUBLIC		Bank category	
Model	**A.1** (Probit)	**A.2** (Tobit)	**B.1** (Probit)	**B.2** (Tobit)
dependent variable	D_GBR	GBR^{TA}	D_GBR	GBR^{TA}
SIZE	0.175***	0.143***		
(β_1)	(0.011)	(0.009)		
D_PUBLIC	-0.288***	-0.290***		
(β_2)	(0.032)	(0.031)		
NPL	-0.022***	-0.022***	-0.026***	-0.026***
(β_3)	(0.004)	(0.004)	(0.004)	(0.004)
TIER1	-0.043***	-0.036***	-0.063***	-0.051***
(β_4)	(0.006)	(0.005)	(0.006)	(0.005)
D_340f	0.174***	0.190***	0.177**	0.163***
(β_5)	(0.066)	(0.055)	(0.082)	(0.062)
D_IFRS	0.622***	0.271***	0.625***	0.246**
(β_6)	(0.119)	(0.094)	(0.138)	(0.097)
ROA	0.133***	0.184***	0.158***	0.205***
(β_7)	(0.024)	(0.022)	(0.025)	(0.023)
SmallCredits			-1.687***	-1.214***
(β_8)			(0.123)	(0.093)
Thrifts			-1.946***	-1.440***
(β_9)			(0.104)	(0.086)
Coops			-1.863***	-1.311***
(β_{10})			(0.102)	(0.083)
1996	0.144	0.149	0.169*	0.168*
(β_{11})	(0.095)	(0.098)	(0.099)	(0.099)
1997	0.202**	0.213**	0.242**	0.242**
(β_{12})	(0.094)	(0.096)	(0.097)	(0.098)
1998	0.323***	0.342***	0.386***	0.393***
(β_{13})	(0.090)	(0.093)	(0.093)	(0.093)
1999	0.375***	0.399***	0.465***	0.469***
(β_{14})	(0.089)	(0.092)	(0.092)	(0.092)
2000	0.533***	0.572***	0.648***	0.662***
(β_{15})	(0.088)	(0.090)	(0.091)	(0.091)
2001	0.682***	0.742***	0.822***	0.851***
(β_{16})	(0.087)	(0.089)	(0.090)	(0.089)
2002	0.823***	0.883***	0.982***	1.007***
(β_{17})	(0.087)	(0.088)	(0.089)	(0.088)
2003	1.213***	1.284***	1.384***	1.417***
(β_{18})	(0.082)	(0.084)	(0.085)	(0.085)
2004	1.373***	1.436***	1.555***	1.578***
(β_{19})	(0.081)	(0.084)	(0.084)	(0.085)
2005	1.519***	1.585***	1.710***	1.735***
(β_{20})	(0.081)	(0.083)	(0.083)	(0.085)
2006	1.861***	1.991***	2.064***	2.148***
(β_{21})	(0.081)	(0.084)	(0.083)	(0.085)
2007	2.103***	2.288***	2.319***	2.456***
(β_{22})	(0.081)	(0.085)	(0.084)	(0.086)
Observations	32,023	32,023	32,023	32,023
Observations = 0	29,218	29,218	29,218	29,218
AUR value	0.859		0.855	
$\bar{R}^2_{pseudo}$		0.2362		0.2381

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Results of pooled regression models.

banks subject to public law are likely to make greater use of GBR reserves than others).

The coefficient on *NPL*, β_3, is strongly significant and negative. This indicates that banks with a low volume of non-performing loans in relation to their customer loans are more likely to use GBR reserves and they are doing so to a greater extent. Since the NPL ratio measures the risk level of a bank, the probability that low risk banks will use GBR reserves, and with a higher intensity, is obviously higher. *H4* is backed.[24]

Looking at *TIER1*, the corresponding coefficient β_4 is significantly negative, meaning that banks which are short of regulatory capital build higher levels of GBR reserves and do so more often. Thus, *H5* is backed, too.

An interesting result is indicated by the positive coefficient β_5 (relating to the variable *D_340f*). This positive coefficient shows that banks that already hold 340f reserves are more likely to use visible GBR reserves, too, and to use them with higher intensity.[25] This supports the hypothesis that reserves serve as a signaling device (inherent in *H7*) for the following reason. Banks which are able to build 340f reserves are assumed to be economically healthy. Thus, they may use GBR reserves (as a clearly visible balance sheet item) to signal their strength to outsiders. Moreover, it might also be the case that some banks first build up 340f reserves to the 4% limit of the overall value of the relevant financial assets, and later on they make use of GBR reserves.

Since $\beta_6 > 0$, the variable *D_IFRS* has a positive and significant influence on the probability and intensity of the use of GBR reserves. Banks that prepare accounts according to IFRS are more likely to hold GBR reserves than other banks. Furthermore, they build higher levels of these reserves. Hence, *H6* is supported as was the case with respect to the correlation coefficients in Table 5.

In line with the function of GBR reserves as a signal of strength, β_7 is significant and positive, meaning that banks with a high ROA are more likely to use GBR reserves and are doing so to a greater extent than banks with a lower return in relation to their total assets. *H7* is confirmed by the regression outcomes as well as the positive correlation coefficients in Table 5.

Finally, all coefficients on the time dummies, β_{11} to β_{22}, are significant at a high level except for the year 1996. Moreover, the coefficients are steadily increasing. This is statistically strong evidence for hypothesis *H3* predicting increasing use of

[24] The corresponding correlation coefficient in Table 5 confirms this result.

[25] This also holds when looking at the corresponding correlation coefficient in Table 5.

GBR reserves over time. Furthermore, it reinforces the results shown in the merely descriptive part of our analysis.

In the following step, we substitute the independent variables *SIZE* and *D_PUBLIC* with control variables for each but one of the four bank categories.[26] Along the lines of Model A.1 and A.2, we first use the probit *Model B.1* addressing the first research question, followed by the tobit model *B.2* with respect to the second one. The key findings of these models are shown in the last two columns of Table 7. When controlling for the bank categories, *Large Banks* are the basis, which is why their coefficient is not stated.

Since all coefficients of the other categories are significantly negative, it is striking that *Large Banks* are most likely to use GBR reserves, followed by *Small Credits*, *Coops*, and *Thrifts*. The same order of precedence holds for the level of the reserves in relation to total assets. These results coincide with the previous finding of size (and being a bank subject to public law, respectively) having a positive (negative) impact on the likelihood and intensity of a bank showing visible reserves. Thus, it confirms *H1* (*H2*). Regarding all other independent variables, the signs and (in the vast majority of cases) even the levels of significance are identical to the previous models. Thus, Models B.1 and B.2 may be considered as robustness checks for the models in block A.

To account for the possibility that the variables examined so far do not capture all potential determinants for using GBR reserves, which is indeed a pivotal assumption for using pooled regression models, we conduct further robustness checks. To this end, we successively investigate a set of variables identical to the ones used in the last four models. We now control for unobservable effects that are constant over time and differ between banks by using a random effects panel methodology in the regressions.[27] The outcomes of these models (which are given similar names to their pooled forerunners by adding an asterisk (*) (as for instance *Model A.1**)), are shown in Table 8, which exhibits an identical structure to Table 7.

The results of these models mimic those of the previous ones to a large extent. However, β_6 concerning *D_IFRS* and β_7 concerning *ROA* change to a negative and significant sign, respectively.[28] Obviously, the bank-specific effect causes the emerg-

[26] Owing to the way we distinguish between the different bank categories, it is necessary to do this rather than including all variables in one single regression equation. Otherwise, the effects of the size and the public character of a bank would not be isolated correctly. By definition, the *Large Banks* contain the largest banks within the sample and the category *Thrifts* consists (almost) entirely of public banks and contains most of these banks.

[27] Due to the very low variance of *D_GBR* on a bank-individual level, a bank-fixed effects estimator would not yield reasonable results. Furthermore, it is not possible to isolate the effect of time-invariant variables (e.g. *D_PUBLIC*) from the unobservable fixed effect using this regression technique.

[28] Moreover, β_5 lost its significance within the tobit models, but did not change its sign.

Control variables	SIZE & D_PUBLIC		Bank category	
Model	**A.1*** (Probit)	**A.2*** (Tobit)	**B.1*** (Probit)	**B.2*** (Tobit)
dependent variable	D_GBR	GBR^{TA}	D_GBR	GBR^{TA}
SIZE	0.588***	0.137***		
(β_1)	(0.072)	(0.018)		
D_PUBLIC	-1.058***	-0.277***		
(β_2)	(0.188)	(0.066)		
NPL	-0.057***	-0.022***	-0.062***	-0.023***
(β_3)	(0.013)	(0.004)	(0.012)	(0.004)
TIER1	-0.093***	-0.019***	-0.132***	-0.026***
(β_4)	(0.021)	(0.007)	(0.021)	(0.007)
D_340f	0.316*	0.026	0.287*	-0.009
(β_5)	(0.162)	(0.056)	(0.0168)	(0.057)
D_IFRS	-0.999***	-0.699***	-0.696**	-0.681***
(β_6)	(0.334)	(0.078)	(0.302)	(0.076)
ROA	-0.170***	-0.065***	-0.153**	-0.063***
(β_7)	(0.065)	(0.020)	(0.062)	(0.020)
SmallCredits			-5.786***	-1.881***
(β_8)			(0.653)	(0.225)
Thrifts			-6.347***	-1.965***
(β_9)			(0.630)	(0.210)
Coops			-5.923***	-1.777***
(β_{10})			(0.630)	(0.205)
1996	0.685***	0.148*	0.734***	0.156**
(β_{11})	(0.224)	(0.076)	(0.227)	(0.075)
1997	0.887***	0.189**	0.979***	0.209***
(β_{12})	(0.226)	(0.076)	(0.230)	(0.076)
1998	1.257***	0.308***	1.400***	0.340***
(β_{13})	(0.222)	(0.073)	(0.227)	(0.073)
1999	1.504***	0.385***	1.692***	0.432***
(β_{14})	(0.225)	(0.073)	(0.234)	(0.072)
2000	1.847***	0.490***	2.035***	0.544***
(β_{15})	(0.233)	(0.071)	(0.242)	(0.071)
2001	2.106***	0.597***	2.316***	0.658***
(β_{16})	(0.242)	(0.071)	(0.249)	(0.071)
2002	2.426***	0.708***	2.651***	0.775***
(β_{17})	(0.250)	(0.071)	(0.253)	(0.071)
2003	3.700***	1.179***	3.896***	1.248***
(β_{18})	(0.282)	(0.068)	(0.269)	(0.069)
2004	4.231***	1.361***	4.430***	1.435***
(β_{19})	(0.300)	(0.069)	(0.278)	(0.069)
2005	4.696***	1.527***	4.902***	1.604***
(β_{20})	(0.318)	(0.069)	(0.287)	(0.069)
2006	5.747***	1.961***	5.938***	2.043***
(β_{21})	(0.364)	(0.070)	(0.311)	(0.070)
2007	6.595***	2.317***	6.785***	2.405***
(β_{22})	(0.403)	(0.072)	(0.332)	(0.072)
Observations (Total)	32,023	32,023	32,023	32,023
Observations = 0		29,218		29,218
AUR value	0.860		0.853	

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Coefficients of random effects models.

ing changes.[29] The positive signs concerning *ROA* produced by the pooled models show that banks with high ROA tend to be the ones that build high levels of GBR reserves and vice versa. However, the opposite signs produced by the panel regressions indicate that within banks an increase in ROA over time is accompanied by a decrease in GBR reserves. Further investigation of this issue delivered the insight that the variance of *ROA* is much larger between than within banks. This finding may explain why it is reasonable to observe the coefficient of *ROA* turning from positive to negative.

A similar line of argument holds for *D_IFRS*. Among banks, we observe that IFRS banks tend to build a higher level of GBR reserves. However, the panel regression indicates that within those banks GBR reserves are primarily used in years pre-IFRS. Moreover, since the vast majority of German banks still exclusively adheres to HGB accounting and since institutions that adopted IFRS at one point in time did not reverse this decision later on, there are only very few changes to the variable *D_IFRS*. In other words, *D_IFRS* can be considered to be (nearly) constant over time. This characteristic may make the variable somewhat vulnerable in the context of a random effects panel regression.

[29] Based on economic considerations, we feel comfortable making the crucial (but untestable) assumption that the unobservable effect is orthogonal to all regressors. Note that it is not possible to test for the absence of correlation with the unobservable effect and thus to control for the appropriateness of applying a random effects methodology.

6 Conclusion

Banks with a profitable business have several instruments at their disposal to set aside money to cover their general risks and also to keep money in the bank for funding further investments. Apart from earnings retention or raising new equity, German banks may deliberately undervalue certain assets to create hidden reserves according to section 340f HGB or declare visible reserves, i.e. reserves for general banking risks according to section 340g HGB. From an information and agency perspective, management should take into account the following aspects in making a decision:

- Hidden reserves are the method of choice because managers gain some discretion in earnings management. However, such reserves are not allowed under IFRS accounting. Moreover, unlike the three other options, 340f reserves merely constitute tier 2, not tier 1 regulatory capital. Therefore, weakly capitalized banks should be more likely to use GBR reserves than IFRS banks.
- Nevertheless, GBR reserves may also be used as a signal of strength. In that sense, fairly well capitalized and profitable banks should be more likely to use GBR reserves instead of or in addition to hidden reserves.
- Using GBR reserves may be interpreted as a bad signal stemming from increased visible risk provisioning. In addition, the use of these reserves may be a consequence of the management's fear that owners will not supply capital for future investments: without management's decision to increase GBR reserves, it would be at the owners' discretion whether to leave earnings in the bank for future investments or to distribute them, as dividends say. The negative signal is less relevant for banks which have some other way of demonstrating their good standing, particularly a very small probability of default. Therefore, banks subject to public law should be more likely to make use of GBR reserves due to their public guarantees. The same holds for large institutions if the 'Too Big To Fail' presumption holds true. Furthermore, both negative signals become less relevant the more frequently they are sent by banks. Therefore we would expect the number of institutions using GBR reserves to rise over time.
- The theory of corporate governance and control predicts that banks with a small number of shareholders are monitored more closely than those with a large number of shareholders. Since banks subject to public law are generally owned by just a few cities or municipalities, they are likely to be closely controlled. This may induce their managers to use hidden reserves instead of visible ones and thus offset the effect described above.

Our empirical analysis of the German banking market, including 32,023 bank-year observations for the period 1995 through 2007, applies probit and tobit models in terms of pooled as well as random effects panel estimation techniques. We arrived at the following statistically significant results:

- Larger banks are more likely to use GBR reserves and tend to hold higher levels than smaller ones. The same is true of banks with low regulatory capital endowment and banks already using hidden 340f reserves.
- Banks that are subject to public law make use of GBR reserves less often and also to a smaller extent. The same holds for high-risk banks, meaning those with relatively high non-performing loan ratios.
- The pooled regression analysis indicates that banks with higher levels of return on assets tend to build GBR reserves more often and to a greater extent. However, our random effects models show that an increase in profitability within banks over time is accompanied by a decrease in the probability and extent of building GBR reserves.
- Among banks we observe that IFRS banks are more likely to use GBR reserves and tend to hold higher levels. However, the panel regressions indicate that within those banks GBR reserves are primarily used in years pre-IFRS.
- Even when controlling for all other factors, the general use of GBR reserves as well as their ratio to total assets increases, almost strictly monotonically, over time.

Agency issues are still sometimes seen as a fairly theoretical concept. However, the present study is another contribution demonstrating that they may yield highly relevant predictions. Their robustness deserves further attention. Moreover, looking at reserves building in banks as a joint decision-making process with respect to visible GBR and hidden 340f reserves may yield interesting results. Further research is therefore needed to explicitly take this into account too.

References

Ahmed, A. S./ Takeda, C./ Thomas, S. (1999): Bank Loan Loss Provisions: A Reexamination of Capital Management, Earnings Management and Signaling Effects, Journal of Accounting and Economics, Vol. 28, pp. 1-25.

Anandarajan, A./ Hasan, I./ McCarthy, C. (2007): The Use of Loan Loss Provisions for Capital Management, Earnings Management and Signalling by Australian Banks, Journal of Accounting & Finance, Vol. 47, pp. 357-379.

Basel Committee on Banking Supervision (BCBS) (2006): Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework - Comprehensive Version, Basel.

Bauer, W. D. (1987): Die EG-Bankbilanzrichtlinie und ihre Auswirkungen auf die Bilanzierungsvorschriften der deutschen Kreditinstitute, Zeitschrift für Wirtschafts- und Bankrecht, pp. 861-868.

Beaver, W. H./ Demski, J. S. (1979): The Nature of Income Measurement, The Accounting Review, Vol. 54, pp. 38-46.

Benartzi, S./ Michaely, R./ Thaler, R. (1997): Do Changes in Dividends Signal the Future or the Past?, Journal of Finance, Vol. 52, pp. 1007-1034.

Bhat, V. N. (1996): Banks and Income Smoothing, Applied Financial Economics, Vol. 6, pp. 505-510.

Christensen, J. A./ Demski, J. S. (2003): Accounting Theory: An Information Content Perspective, New York et al.

Docking, D. S./ Hirschey, M./ Jones, E. (1997): Information and Contagion Effects of Bank Loan-Loss Reserve Announcements, Journal of Financial Economics, Vol. 43, pp. 219-239.

Emmerich, G./ Reus, P. (1995): Zur Vorsorge für 'allgemeine Bankrisiken': Handelsrechtliche Gestaltungswahlrechte und ökonomische Implikationen, IFBG-Studien, Göttingen.

European Commission (1986): Council Directive 86/635/EEC of 8 December 1986 on the annual accounts and consolidated accounts of banks and other financial institutions, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31986L0635:EN:HTML, (2008/01/31).

Fawcett, T. (2006): An Introduction to ROC Analysis, Pattern Recognition Letters, Vol. 27, pp. 861-874.

FDIC (1997): An Examination of the Banking Crises of the 1980s and Early 1990s, Washington D.C.

Flach, P./ Blockeel, H./ Ferri, C./ Hernández-Orallo, J./ Struyf, J. (2003): Decision Support for Data Mining: An Introduction to ROC Analysis and its Applications, in: Mladenic, D./ Lavrac, N./ Bohanec, M./ Moyle, S.: Data Mining and Decision Support: Integration and Collaboration, Kluwer, pp. 81-90.

Flannery, Mark J./ Kwan, S. H./ Nimalendran, M. (2004): Market Evidence on the Opaqueness of Banking Firms' Assets, Journal of Financial Economics, Vol. 71, pp. 419-460.

Fonseca, A. R./ González, F. (2008): Cross-country determinants of bank income smoothing by managing loan loss provisions, Journal of Banking & Finance, Vol. 32, pp. 217-228.

Grammatikos, T./ Saunders, A. (1990): Additions to Bank Loan-Loss Reserves: Good News or Bad News?, Journal of Monetary Economics, Vol. 25, pp. 289-304.

Greenawalt M./ Sinkey, J. (1988): Bank Loan-Loss Provisions and the Income-Smoothing Hypothesis: An Empirical Analysis, Journal of Financial Services Research, Vol. 1, pp. 301-318.

Healy, P. M./ Palepu, K. O. (1988): Earnings Information Conveyed by Dividend Initiations and Omissions, Journal of Financial Economics, Vol. 21, pp. 149-175.

Ianotta, G. (2006): Testing for Opaqueness in the European Banking Industry: Evidence from Bond Credit Ratings, Journal of Financial Services Research, Vol. 30, pp. 287-309.

Kanagaretnam, K./ Lobo, G. J./ Yang, D. H. (2004): Joint Tests of Signaling and Income Smoothing through Bank Loan-Loss Provisions, Contemporary Accounting Research, Vol. 21, pp. 843-884.

Krumnow, J./ Sprißler, W./ Bellavite-Hövermann, Y./ Kemmer, M./ Alves, S./ Brütting, C./ Lauinger, R. H./ Löw, E./ Naumann, T. K./ Paul, S./ Pfitzer, N./ Scharpf, P. (2004): § 340g HGB: Sonderposten für allgemeine Bankrisiken, in: Rechnungslegung der Kreditinstitute – Kommentar zum deutschen Bilanzrecht unter Berücksichtigung von IAS/IFRS, 2nd ed., Stuttgart, pp. 604-609.

Levine, R. (2004): The Corporate Governance of Banks: A Concise Discussion of Concepts and Evidence, The Certified Accountant, pp. 843-884.

Laeven, L./ Majnoni, G. (2003): Loan Loss Provisioning and Economic Slowdowns: Too Much, Too Late?, Journal of Financial Intermediation, Vol. 12, pp. 178-197.

Lintner, J. (1956): Distribution of Incomes of Corporations among Dividends, Retained Earnings, and Taxes, The American Economic Review, Vol. 46, pp. 97-113.

Lobo, G. J./ Yang, D.-H. (2001): Bank Managers´ Heterogeneous Decisions on Discretionary Loan Loss Provisions, Review of Quantitative Finance and Accounting, Vol. 3, pp. 223-250.

Madura, J./ McDaniel, W. R. (1989): Market Reaction to Increased Loan Loss Reserves at Money-Center Banks, Journal of Financial Services Research, Vol. 3, pp. 359-369.

Morgan, D. P. (2002): Rating Banks: Risk and Uncertainty in an Opaque Industry, American Economic Review, Vol. 92, pp. 874-888.

Myers, S. C. (1984): The Capital Structure Puzzle, Journal of Finance, Vol. 39, pp. 147-175.

Myers, S. C./ Majluf, N. S. (1984): Corporate Financing and Investment Decisions when Firms Have Information the Investors Do not Have, Journal of Financial Economics, Vol. 13, pp. 187-221.

Scheiner, J. H. (1981): Income Smoothing: An Analysis in the Banking Industry, Journal of Bank Research, Vol. 12, pp. 119-123.

Shrieves, R. E./ Dahl, D. (2003): Discretionary accounting and the behavior of Japanese banks under financial duress, Journal of Banking & Finance, Vol. 27, pp. 1219-1243.

Tobin, J. (1958): Estimation of Relationships for Limited Dependent Variables, Econometrica, Vol. 26, pp. 24-36.

Wagener, H./ Böcking, H.-J./ Freiling, A./ Ernsting, I./ Fitzner, V. (1995): Banken und Bankkonzerne in Deutschland: Jahresabschlüsse 1993, Düsseldorf.

Wall, L. D./ Koch, T. W. (2000): Bank Loan-Loss Accounting: A Review of Theoretical and Empirical Evidence, Federal Reserve Bank of Atlanta Economic Review, Second Quarter 2000, Atlanta.

Waschbusch, G. (1994): Die bankspezifische offene Risikovorsorge des § 340g HGB, Die Bank, pp. 166-168.

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