Essays on Banking

by

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Summary

The work for this thesis was done during the period 2010 to 2016, after the worst financial crisis since the Great Depression, and in the immediate wake of the Eurozone debt crisis that has casted doubts on European integration. With the crisis largely blamed on bank excessive risk-taking and supervisors' inability to contain it, and with the aim to prevent similar crises in the future, much of the policy discussions and regulatory actions have focused on ways to address both of these failures of market economies. One way concerns the strengthening of market discipline, i.e., strengthening the incentives and capacity of external stakeholders (depositors, shareholders and other holders of bank liabilities) to induce more prudent risk-taking behavior by bank managers.

Thus motivated, this thesis focuses on the channels and effectiveness of market discipline. Said differently, it explores whether, and how, market forces could be trusted to do a better job in containing risk-taking behavior by banks and thus effectively support and supplement supervisors' efforts. From a policy-making point of view, the thesis explores whether market discipline can promote financial stability.

The thesis comprises of three empirical papers. The first explores whether the expected government support of banks, implicit or explicit, weakens market discipline. The second explores whether the intrusive external monitoring by knowledgeable and influential external stakeholders fosters more prudent loan-loss provisions and, hence, more prudent accounting practices by banks. The third paper extends the second, taking into account the role of the institutional and social environment in an international setting. The results from all three papers are supportive of the notion that market discipline can promote financial stability.

Details follow.

The first paper explores whether expected government support weakens market discipline by bank shareholders, especially after the eruption of the global financial crisis in 2008. Two counter-veiling forces are at work. On the one hand, as it is suggested by the related literature, the expected support may give banks greater leeway to undertake risks, for it reduces the monitoring incentives of depositors and other bank creditors. Shareholders, recognizing the resultant higher probability of default as well as the possibility that they might be wiped out in case of bank default, have an incentive to intensify monitoring and exercise stronger market discipline. On the other hand, the expected support may also reduce the possibility of a bank run, weakening as a result the need for monitoring by bank shareholders and, hence, market discipline on their part.

Expected support is measured as the difference of two bank credit ratings from Moody's: an all-in rating, which encompasses expected support, and a stand-alone rating, which does not. We estimate a model in which a forward-looking measure of shareholder value, the market-to-

book ratio, is the dependent variable and the measure of expected support is one of the explanatory variables. A negative coefficient of the expected support would be consistent with market discipline for it would indicate that shareholders are willing to pay less for banks with higher expected support

The results, from a sample of about 250 banks worldwide, indicate that, far from weakening market discipline by shareholders, the expected support strengthens it, and more so for the riskier banks – i.e., those with lower stand-alone rating. The results also highlight the two counter-veiling effects of the expected support on market discipline. Specifically, as the size of the expected support increases, its negative effect on the market-to-book ratio decreases.

The second paper sheds light on earnings management via loan-loss provisions (LLPs) and the associated trade-off between financial-statement transparency and financial stability, by exploiting time and cross-sectional variation. The time variation pertains to the well-documented shift towards more forward-looking LLPs after the crisis of 2008. The working hypothesis is that the rules concerning LLPs effectively shifted in favor of forward-looking provisions. This shift is expected to be associated with stronger income smoothing and signaling, and more so for banks subject to weaker market discipline. The cross sectional variation pertains to the intrusive external monitoring by funds that are members of the US Sustainability Investment Forum (USSIF). The working hypothesis is that this process amounts to stronger monitoring and, hence, stronger market discipline. Thus, it is expected that income smoothing and signaling will be weaker for the banks in which USSIF funds invest relative to the remaining banks. Moreover, after the said shift in supervisory and regulatory preferences, income smoothing and signaling will increase by less for banks in which USSIF funds invest.

The results, from a sample of more than 300 publicly-held US bank holding companies, over the period 1999 – 2014, confirm that the banks under the intrusive monitoring exhibit less earnings management. Since, however, this differential behavior got more pronounced after the regulatory shift, the results further suggest that USSIF funds induce provisioning behavior that goes well beyond the stricter application of the existing accounting and supervisory rules, thus ameliorating the aforementioned trade-off.

The third paper explores whether the inclusion of a bank in the Dow Jones Sustainability Index (DJSI) reduces bank managers' incentives for earnings management through loan-loss provisions. The inclusion in the DJSI depends on a rigorous bank assessment, conducted each year. The working hypothesis is that being included in the DJSI constitutes a credible signal to outside stakeholders of prudent behavior. An aspect of such behavior is less earnings management through loan-loss provisions.

The results from a sample of 297 banks around the globe, over the period 2004 – 2010, indicate that banks included in the DJSI engage in less earnings management relative to the banks that were assessed but not included. This more prudent provisioning behavior persists

when we control for the strength of private sector monitoring with country-level indices for private sector monitoring and the quality of external audits. Yet, it largely diminishes when we control for the strength of supervisory power and capital regulation. The last result poses an interesting question: Is stronger supervision a substitute of market discipline? Or, is the DJSI assessment process geared towards accepting more banks from countries with stronger supervision;

All in all, the papers in this thesis highlight the important and decisive role market discipline plays in the financial system. They suggest that shareholders, probably driven by the objective difficulty of accurately assessing banks' true condition and prospects, appreciate credible signals of prudent behavior. The results are also supportive of the power of external monitoring as a restraining factor in bank-managers' risk-taking.

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To my family

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Introduction

In recent years, considerable attention has been paid to the topic of market discipline in banking. Market discipline is commonly defined as a state in which banks' stakeholders face costs that are positively related to bank risk and they react on the basis of these costs. For example, shareholders start selling their shares and depositors start moving their funds to less-risky banks. As the affected banks fail, some of the holders of bank liabilities (creditors, shareholders and depositors) will likely lose money. The anticipation of such loss makes the holders of bank liabilities sensitive to the risks undertaken by banks, thus restricting bank-managements' leeway to undertake excessive risks. Hence, the expectation is that effective market discipline can promote, and be associated with, greater financial stability.

Prior to proceeding to the next chapters, I would like to introduce the reader to the market discipline roadmap of this thesis, as also to highlight the role of each key player, namely governments, stakeholders, external assessment institutions, as well as regulators and supervisors.

The reason market discipline is needed is that banks are prone to engage in moral hazard behavior. Banks collect deposits and invest these funds in risky assets, such as loans. To shield against insolvency, banks hold capital reserves against adverse outcomes in their investments in risky assets. But the bank's private solvency target may not take into account the interests of stakeholders, such as creditors, depositors and shareholders, nor of society as a whole. As a result, banks may engage in excessive risk-taking.

Banks' risk taking incentives is an issue of considerable importance for overall financial system stability and is therefore an issue of much interest for supervisory authorities and government regulatory agencies entrusted with the task of overseeing financial stability in countries around the world. Hence, the extensive efforts to restrain these incentives through regulation and supervision. Yet, the severe economic and social costs of banking crises often force governments to support fragile banks; and make market participants expect such support when need arises. Governments can prop up the banking system in countless ways, such as, guaranteeing some bank liabilities, extending loans to banks, helping them clean up their balance sheets from non-performing loans, and providing equity capital.

Furthermore, this issue has initiated interest among researchers for the drivers of risky behavior within banking institutions in general and, in particular, the effects of the expected support on different bank stakeholder's inclination for risk, such as bank shareholders, managers, depositors, and other creditors. As a result of their research, expected government support has progressively come to be widely recognized as an important determinant of market

discipline of banks, the question being whether the expected support strengthens or weakens discipline.

Another important issue pertaining to market discipline, which has resurfaced forcefully the literature during the financial crisis, is bank managers' incentives to manage earnings. The earnings management literature has dealt with bank managers' incentives to use loan-loss provisions as an income smoothing tool. Loan-loss provisions play a crucial role in a bank's financial statements, given that they are one of the main accrual expenses for banks set aside to face a future deterioration of credit portfolio quality. Managers will increase (decrease) loan-loss provisions when earnings are high (low) in order to stabilize net profits. Although the current loan-loss provisions requirements are underlined by an incurred loss framework, the recent financial crisis has forced regulators to reevaluate financial accounting standards and propose a more forward looking provisioning system that allows for earlier in the credit cycle recognition of future expected loan losses.

The incurred loss framework recognizes a provision only after the occurrence of an event that could lead to loan defaults in the future. Such a framework could amplify business cycle fluctuations as it accelerates a vicious circle between the financial and real sectors of the economy during a financial downturn. On the contrary, a more forward looking provisioning system could create a buffer against future losses earlier in the business cycle, by allowing greater managerial discretion in loan losses recognition. Although this type of discretion allows for loan-loss reserves buildup in good times when earnings are high, it also introduces elements of earnings smoothing that could lead to opportunistic accounting behavior, thus affecting financial stability.

Such opportunistic behavior can be restrained by external monitors that induce bank managers to operate in a more prudent manner and convey strong relevant signals to the investors. In this thesis, the external monitors are the USSIF (US Sustainability Investment Forum) funds that invest in bank shares, and the Sustainability Asset Management (SAM) that screens banks for inclusion in the Dow Jones Sustainability Indices (DJSI).

USSIF is US's membership association for socially and environmentally responsible investment professionals, firms, institutions and organizations. USSIF funds base their investment decisions on firms' ESG (Environment, Social, Governance) performance. The USSIF funds compensate for the lack of readily available and reliable ESG data and ratings with an intrusive screening and monitoring process. During the monitoring process there is active engagement of the top management of the funds and the banks, with annual and, quarterly meetings.

Pertaining to SAM's assessment process, the DJSI consists of firms that achieved the highest scores of their sectors in terms of sustainability (best-in-class approach). The assessment is being conducted annually by Sustainability Asset Management (SAM). Each year, the largest companies listed in the Dow Jones World Index (DJGI) are invited to voluntary participate in a rigorous assessment and the top 10% companies from every sector in terms of sustainability are included in the DJSI.

The references section to follow is a list of studies that I have come across during my PhD studies at the Department of Banking and Financial Management and consider as essential reading for someone who is now being introduced to the topic.

The thesis has the following structure: the first chapter presents the paper "Expected Government Support of Banks and Market Discipline by Shareholders"; the second chapter consists of the paper "Loan-loss provisions under intrusive external monitoring: Evidence from US banks"; and the last chapter presents the paper "Bank earnings management under civil society scrutiny: Evidence from an international setting".

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Chapter 1

Expected Government Support of Banks and Market Discipline by Shareholders

Abstract.

Does the expected government support weaken market discipline by bank shareholders, as in the case of bank creditors? There are two counter-veiling forces at work: the weaker discipline by bank creditors, which suggests no, and the lower possibility of a bank run, which suggests yes. The empirical results, from a sample of about 250 banks worldwide, provide strong evidence that the answer is 'no'. Specifically, the results indicate that shareholders are not willing to pay more for banks with higher expected support. On the contrary, they are willing to pay less for those banks for which the need for future support is more likely. Highlighting the above counter-veiling forces, as the expected support increases its negative valuation effect decreases.

1.1 Introduction

Does the expected government support of banks weaken market discipline? A growing body of empirical work indicates that it does. This work revolves around three issues: who exercises market discipline, how, and how expected support is measured. A related question is whether discipline increased or decreased after the eruption of the global financial crisis in 2008. Two opposing forces are at work here: the extensive –if not unprecedented— measures to support banks after the eruption of the crisis, and the higher awareness of bank risk by all bank stakeholders.

For the first issue, the literature focuses on depositors and other bank creditors – mainly banks and holders of subordinated debt. For the second issue, market discipline is exercised with higher cost of funds and bigger sensitivity of net funding flows to banks with higher riskiness. Riskiness is measured with accounting measures, such as the z-score and various variables related to CAMELS, such as, non-performing loans to gross loans; plus measures of market risk, such as, the standard deviation of daily returns of bank shares; and with credit ratings. For the case of depositors, see, among others, Jacewitz and Pogach (2013), Gilbert and Vaughan (2001), Martinez Peria and Schmukler (2001) for the cost of deposits; and Berger and Turk-Ariss (2014), Birchler and Maechler (2001), Martinez Peria and Schmukler (2001), Gilbert and Vaughan (2001) for deposit-flows sensitivity. For other bank creditors, see Distinguin, Kouassi and Tarazi (2013) for the sensitivity of interbank deposits; and Acharya, Anginer and Warburton (2014), Balasubramnian and Cyree (2011), Pop (2006), Sironi (2003) for the cost of subordinated debt.

For the third issue, the existing literature has used a variety of approaches, both direct and indirect. The first include the distinction between insured and uninsured deposits, deposit insurance –explicit or implicit—, plus credit ratings and in particular the Fitch support rating that measures the probability of support in case of need. The indirect approaches include size, which is a proxy of ‘too big to fail’, market perceptions about the probability of support (for example, a bailout –a form of support— is considered more likely in Europe than in the US), and whether a bank is government-owned.

But what about shareholders? Does the expected government support weaken market discipline, as in the case of bank creditors? Logic does not give a clear-cut answer. On the one hand, the expected support gives greater freedom of action to banks to undertake risks, for it reduces the monitoring incentives of depositors and other bank creditors. Shareholders, recognizing the resultant higher probability of default as well as the possibility that they might

be wiped out in case of bank default, have an incentive to intensify monitoring and exercise stronger market discipline. On the other hand, the expected support may also reduce the possibility of a bank run, weakening as a result the need for monitoring by bank shareholders and, hence, market discipline on their part.

The relevant empirical literature is rather thin and predates the crisis of 2008. Briefly, Bliss and Flannery (2002) look at the ability of bondholders and shareholders to influence managerial decisions. Their evidence is at best inconclusive. More closely related to this work, Gropp, Vesala and Vulpes (2006) do not find evidence that the expected support weakens market discipline by shareholders.

Hence, it remains an open question for empirical work whether the expected government support weakens market discipline by shareholders – especially after 2008. We address it in this paper. Specifically, we explore how a measure of expected support is related to a forward-looking measure of shareholder value, namely, the market-to-book ratio. We measure the expected support as the difference of two bank credit ratings from Moody's: an *all-in rating*, which encompasses expected support, and a *stand-alone* rating, which does not. This difference has been used in the existing literature as a proxy of the size of the expected support (see, among others, Packer and Tarashev [2011], Schich and Lindh [2012] and Antzoulatos and Tsoumas [2014]).

Our testing strategy is straightforward. We estimate a model in which the market-to-book ratio is the dependent variable and the measure of expected support is one of the explanatory variables. A negative coefficient of the expected support would be consistent with market discipline for it would indicate that shareholders are willing to pay less for banks with higher expected support. As in the existing literature, the other explanatory variables are bank-specific, pertaining to bank profitability, risk-taking, the structure of the balance sheet, the composition of the income statement and quality of management; and country-specific, pertaining to the state of the macroeconomy and the institutional characteristics of the country.

The results are very interesting. Far from weakening market discipline by shareholders, the expected support seemingly strengthens it, and more so for the riskier banks, i.e., those with lower stand-alone rating. The results also highlight the two counter-veiling effects of the expected support on market discipline. Specifically, as the size of the expected support increases, its negative effect on the market-to-book ratio decreases. As far as we know, this is the first paper that documents this effect. Also, the results indicate that market discipline did not weaken after the eruption of the global financial crisis.

The remainder of the paper is organized as follows. Section 2 discusses the existing

literature on market discipline for banks, with a focus on the more recent papers. Section 3 presents the model and the variables used. Section 4 discusses the results, while section 5 concludes.

1.2 Literature review

Market discipline in banking was gaining ground as a research topic long before the eruption of the global financial crisis in 2008. The prism, however, was that of depositors and other bank creditors, and the question whether bank risk-taking was positively related with yields on bank liabilities, such as, deposits and subordinated debt, and negatively related with deposits. Another more current theme is whether market discipline declined after the eruption of the crisis in 2008.

Market discipline by depositors.

The guiding idea is that small depositors have little incentive and often high costs in monitoring banks. Deposit insurance and other forms of support –explicit or implicit— may further weaken monitoring incentives. Originally, in the 1990s and the early 2000s, the literature focused on the US, where significant changes in the regulatory environment altered depositor (and investor) perceptions about the probability of bank support in case of need. Subsequently, the geographical coverage expanded to, more or less, the whole world.

Market discipline is measured with the sensitivity of deposits and their cost to measures of bank risk. When market discipline works, depositors demand higher interest rates and/or withdraw deposits from riskier banks. Risk is measured mostly with accounting variables, such as the z-score and various combinations of variables related to CAMELS. It is also measured with credit ratings and the standard deviation of daily stock-market returns.

Expected support is measured directly and indirectly; directly through the distinction between insured and uninsured deposits, deposit insurance –explicit or implicit—, and credit ratings; indirectly through size –which serves as a proxy of ‘too big to fail’—, government ownership of banks, and market perceptions about the probability of support. These perceptions refer to ‘too big to fail’, changing perceptions in the US about support in case of need –as a response to institutional changes and authorities’ response in cases of financial fragility—, as well as that support is more likely in Europe than in the US.

The evidence is overwhelmingly for the notion that the expected support weakens discipline by depositors. The discussion below focuses on the most recent papers, yet it is

indicative of the testing techniques and the measures of support used in the literature so far.

Berger and Turk-Ariss (2014) examine whether deposit growth is sensitive to two accounting measures of risk: equity to assets and non-performing loans to gross loans. A higher value of the first is associated with lower risk; the opposite for the second. Hence, a positive coefficient of the first measure and a negative of the second would indicate the existence of market discipline by depositors. Using a sample of 2038 banking organizations in the US, 21 EU countries and Switzerland, they find evidence of discipline, though it weakened after the eruption of the crisis. They also find that discipline was stronger for US banks, consistent with the prevailing belief that bank bailouts were more likely in Europe than the US and –hence— consistent with weakening market discipline due to expected support. Comparing large and small US banks, Berger and Turk-Ariss find that discipline was stronger for the former, which they regard as consistent with the fact that large banks have more sophisticated depositors as well as more uninsured deposits. Note, however, that the size of a bank is usually taken in the literature as a proxy of 'too big to fail', which is associated with weaker discipline.

Birchler and Maechler (2001) explore whether observable bank characteristics are related to the ratio of uninsured deposits to total deposits, in a sample of 250 Swiss banks, over the period 1987 – 1998, taking into account the changes in deposit insurance over time and the differences in depositor protection across different segments of the Swiss banking system. For the last, cantonal banks, that is, banks owned by the cantons, effectively enjoy a state guarantee. The bank characteristics, in the spirit of a CAMEL rating but taking additionally into account the peculiarities of the Swiss banking system, include capital adequacy; four proxies of asset quality, namely, non-saving deposits to total deposits, liabilities to customers to mortgage lending, mortgage lending to total liabilities and interbank borrowing to total liabilities; non-interest expenses to total liabilities as a proxy of quality of management; four measures of earnings, namely, profit rate, net commission revenue to total liabilities, net interest revenues to total liabilities and the growth rate of total liabilities; and liquid assets to total liabilities as a proxy of liquidity. They find evidence of market discipline, as the ratio of uninsured deposits to total deposits is related to the bank characteristics and institutional characteristics. Notably, they also find that state guarantees weaken market discipline.

Jacewitz and Pogach (2013) findings are also consistent with the notion that the expected support weakens market discipline. They proxy expected support with the 'too big to fail' of big banks, and test whether the difference in the rates of insured and uninsured MMDAs, at the branch level of American banks, are related to the size of a bank, even after controlling for balance sheet measures of risk which capture various aspects of the CAMEL rating.

An implicit test of market discipline by depositors is the examination of whether deposit insurance increases the probability of banking crises. González (2005), summarizing the empirical evidence, concludes that the answer is positive –which is consistent with weakening market discipline—, yet a stronger institutional environment reduces bank risk-taking. His own findings, with data for 251 banks, from 36 countries from all over the world, for the period 1995 – 1999, provide weak evidence that deposit insurance reduces bank risk-taking and, hence, reduces the probability of banking crises.

Martinez Peria and Schmukler's paper (2001) is one of the few that do not find evidence that deposit insurance weakens market discipline. They measure market discipline with the change in deposits and with deposit interest rates, and expected support with deposit insurance, for banks in Argentina, Chile and Mexico, in the 1980s and 1990s. Specifically, they regress changes in deposits as well as deposit rates on measures of bank riskiness. These measures, in the spirit of CAMEL ratings, include capital-to-assets for capital; non-performing loans to gross loans and loan concentration by sector, as proxies for asset quality; non-interest expenditures to total assets for efficiency; ROA for earnings; and cash to total assets and securities to total assets for liquidity. They find that both dependent variables are sensitive to these measures of risk. Yet, comparing insured and uninsured deposits they do not find evidence that deposit insurance weakens market discipline.

Martinez Peria and Schmukler (2001) also find that market discipline increases after crises. Perhaps, their divergent from the rest of the literature results are due to the traumatic experience of these countries during the sample period. Simply put, when a crisis strikes, the ex-ante distinction between insured and uninsured deposits may have little effect on the losses incurred by depositors. And their paper covers a period during which the repercussions of the 'debt crisis' of the 1980s were still felt in the sample countries.

Market discipline by other bank creditors.

Here, market discipline is measured with changes in the level of financing –mainly interbank deposits— and the yield spreads of bank debt instruments –mainly subordinated debt.

Balasubramnian and Cyree's evidence (Balasubramnian and Cyree [2011]) is supportive of the notion that the expected support weakens market discipline. Specifically, they find that the yield spreads of bank subordinated debt were sensitive to banks' risk measures before the LTCM bailout in 1998. After the bailout, which, presumably, strengthened market perceptions about the 'too big to fail' concern, they were not. Thus, Balasubramnian and Cyree document a

full circle in market perceptions in the US: prior to the Federal Deposit Insurance Corporation Improvement Act (FDICIA) in 1991, which removed implicit guarantees for banks, the yield spreads were not sensitive to bank risks; from 1991 until the LTCM bailout, they were; afterwards, they were not again.

Pop's evidence is supportive too (Pop [2006]). Using a sample of 95 Canadian, European, Japanese and US banks, over the period 1995 – 2002, and after controlling for issuer and issue characteristics, Pop finds that the subordinated bonds of European banks are traded at a lower spread than that of the North American banks. This is attributed to the higher expectation of government support in Europe.

Sironi (2003) also finds that the spreads of subordinated debt issued by European banks over the period 1991 – 2000 were sensitive to the banks' risk, but less so for public sector banks. Presumably, expected support is higher for public sector banks. Sironi works with primary market prices, while Pop with secondary.

There is also ample evidence that the 'too big to fail' concern, and the resultant expectation that the authorities will bail out bank creditors, may weaken market discipline. This evidence boils down to a funding advantage that the biggest financial institutions enjoy: controlling for their risk-taking, their bond spreads are smaller. Indicatively, Acharya, Anginer and Warburton (2014), using data for the period 1990 – 2012, find that the bond spreads are sensitive to the risk of the issuing financial institutions, with the exception of the biggest ones – the ones for which the 'too big to fail' expectation is strongest. They also find that the regulations enacted after the eruption of the crisis to address the 'too big to fail' issue were not effective – which is consistent with the notion that market discipline did not strengthen.

Distinguin, Kouassi and Tarazi (2013) add one more dimension to the analysis: the strength of regulatory discipline. Stronger regulatory discipline reduces the need for monitoring by depositors and other bank creditors, and thus weakens market discipline. Another innovation is that they use uninsured interbank deposits. Banks, presumably, have a higher capacity to evaluate other banks and hence exercise market discipline – unless, of course, there is a collective risk-taking behavior. Using a sample of 207 banks, in ten central and eastern European countries, for the period 1995 – 2006, they find that the level of interbank deposits is negatively related to the three-year rolling standard deviation of ROA and ROE, and positively related to the three-year rolling average of the z-score. Hence, market discipline works.

More interestingly for this work, two institutional variables, an index for the rule of law and a dummy that takes the value of one in case the bank-resolution regime in a country includes bank liquidation in addition to restructuring, seemingly moderate the sample banks'

risk-taking behavior. Everything else equal, liquidation hurts shareholders more than restructuring. Hence, it should be associated with stronger market discipline. The effect of the dummy is consistent with the view that market discipline by shareholders influences the decisions of bank-managers.

Yet, the evidence that regulatory discipline affects the strength of market discipline is not unchallenged. The findings of Gilbert and Vaughan (2001) are indicative. Gilbert and Vaughan explore the reaction of deposit growth rates and yield spreads to 87 announcements of enforcement actions for safety and soundness reasons, by the Federal Reserve, on 87 different banks, over the period 1990 – 1997. These announcements amount to negative information for the affected banks. They find no unusual deposit withdrawals or spread increases following the announcements, which they interpret as evidence that disciplinary actions did not enhance market discipline.

Last but not least, related to market discipline by bank creditors are the papers that try to measure the funding advantage that banks may enjoy thanks to the expected support. The estimates of this advantage vary widely, but are substantial. For example, Ueda and Weder di Mauro (2012), using credit ratings from Fitch, estimate it to between 60 – 80bp. For a neat presentation of ways to measure the funding advantage, see Noss and Sowerbutts (2012).

Market discipline by bank-shareholders.

The existing literature is rather thin. Bliss and Flannery (2002) look at the ability of bondholders and shareholders to influence managerial decisions. The ability to influence is a necessary condition for effective market discipline, together with the ability to accurately assess a bank's condition and prospects (monitoring). Their evidence is at best inconclusive. While they find substantial support for the ability to monitor, they do not find that shareholders and bondholders influence management actions in US bank holding companies.

More closely related to this work, Gropp, Vesala and Vulpes (2006) do not find evidence that the expected support weakens market discipline by shareholders, though it does in the case of bondholders. This interesting result highlights that shareholders, being junior to all other suppliers of funds, are more sensitive to bank risk-taking. In greater detail, using market data for European banks over the period 1991 – 2001, they find that the yield spreads of subordinated debt and the distance-to-default calculated from stock-market data can predict bank fragility. Yet, for the banks for which the probability of support is bigger, the predictive power of the spreads diminishes; but not that of the distance to default. The said banks are distinguished by a

Fitch 'support rating' that takes the value of 1 or 2, i.e., the two highest values in the five-degree scale. Compared to Gropp, Vesala and Vulpes (2006), our approach is more straightforward, as it explores the effect on market discipline in all states of nature, not only for banks facing problems. In addition, it uses a proxy of the size of expected support not of the probability of support.

Lastly, Gandhi and Lustig (2015) provide some indirect evidence about the detrimental effect of expected support on discipline by shareholders. In particular, they find that the largest –by assets— US commercial banks exhibit lower risk-adjusted stock-market returns than small- and medium-sized banks, despite that they have higher leverage. Gandhi and Lustig attribute this finding to the greater expected support of the biggest banks.

1.3 Estimation

The model.

We examine whether the expected government support affects the *market-to-book* ratio (*MB*). This is a forward-looking measure of a bank's value, for stock prices are forward-looking as well.

To do so, we estimate the model

$$MB_{i,j,t} = \alpha Expected\_Support_{i,j,t} + \sum_k \beta_k X_{i,j,k,t-1} + \sum_l \gamma_l Z_{j,l,t-1} + \delta_j + \varepsilon_t + u_{i,j,t}$$

where *i* denotes banks, *j* countries and *t* time; X is a vector of bank-specific control variables, Z a vector of country-specific control variables, δ_j and ε_t country and time dummies, $u_{i,j,t}$ the usual stochastic term, and α, β_κ and γ_l the coefficients to be estimated. With the exception of *Expected_Support* and the stand-alone rating (see below), the explanatory variables are lagged once to account for delays in public information and to examine the effect of ex-ante measures of risk. However, the results (available upon request) remain unchanged with contemporaneous variables. The estimation method is OLS with robust standard errors.

By using country fixed-effects and, hence, analysing within-country variations, we test whether an increase in the expected support will lead to higher market-to-book ratio; not whether banks with the same observable characteristics –one of which is the size of the expected support—, but located in different countries, will have similar ratios. In essence, we

test whether an increase in expected support will lead to higher valuation, not whether higher expected support is associated with higher valuation. The country fixed-effects capture the impact of time-invariant factors, such as, the origin of a country's legal code (La Porta et al. [1998]); the role of the banking system in a country's economy –for example, whether banks have equity positions in industrial firms—; the existence of explicit or implicit deposit insurance; the levels of financial and economic development; institutional and legal factors, such as, supervisory discipline (González [2005]); and whether the resolution regime in a country includes bank liquidation in addition to restructuring (as in Distinguin, Kouassi and Tarazi [2013]).

Explanatory variables.

Our focus is on the *Expected_Support.* A positive coefficient for this variable would provide evidence that the expected support weakens market discipline: Everything else equal, investors are willing to pay more for the shares of a bank with a higher support. By the same logic, a negative coefficient would provide evidence that the expected support strengthens market discipline: Everything else equal, investors are willing to pay less since higher support weakens market discipline from a bank's debt-holders thus giving bank-management the capacity to assume bigger risks.

We proxy the *Expected_Support* with the difference between a bank rating that encompasses expected support in case of need, the so-called *all-in rating*, and the *stand-alone* rating. Both from Moody's.

The stand-alone rating, Moody's *bank financial strength rating* (*BFSR*), is intended to provide a measure of a bank's financial condition that is comparable across countries. As such, it does not incorporate any expected support due, for example, to 'too big to fail' considerations, nor does it take into account the risk of a deposit freeze (Moody's [2007b]). In essence, *BFSR* is the local currency deposit rating that would be assigned by Moody's without any expected external support.

Starting from *BFSR*, Moody's sequentially takes into account expected support from operating parent, cooperative group, regional government and national government (Moody's 2007b) to arrive at the all-in-rating, the *long-term deposit rating* (*LTDR*). Government's part most likely comprises the biggest part of the expected support, for the capacity –and, probably, the willingness— of the operating parent, the cooperative group and the regional government to provide support is likely boosted by the national government. As Moody's states, "when

multiple forms of support are anticipated, systemic support (the final stage) will be further shaded in order to avoid double-counting external support." (Moody's, 2007b, p. 5).

LTDR and *BFSR* are in different scales. The first is in the standard Moody's scale, Aaa to C. The second is in the scale A to E. Following the typical practice in the empirical literature on credit ratings, we convert the first scale to a numerical one, with Aaa assigned the value 20, Aa1 the value 19, all the way to C which is assigned the value zero. As for the *BFSR*, a typical assignment is as follows: A $\rightarrow$ 12, A- $\rightarrow$ 11, ..., E $\rightarrow$ 0. Due, however, to the different scales, a notch does not have the same value for the two ratings. To overcome the difficulties arising from the different scales, we employ Moody's mapping of *BFSR* to the standard scale (Moody's 2007a and 2009), as shown in appendix table A1.

$$\binom{Expected}{Support} = \binom{Long-term}{Deposit\ Rating} - \binom{Bank\ Financial}{Strength\ Rating} = LTDR - BFSR$$

The sources and definitions of the remaining explanatory variables are summarized in table A2.

The bank-specific variables pertain to profitability, risk-taking, structure of the balance sheet, composition of the income statement and quality of management. In greater detail, return on average assets, ROAA, is a proxy of short-run profitability. The results were virtually the same with ROAE. The stand-alone rating, *BFSR*, is a measure of riskiness; a lower *BFSR* characterizes a riskier bank, a higher *BFSR* a more prudent one. Equity to total assets is a proxy of both capital adequacy and leverage. Loan-loss provisions to gross loans is a proxy of conservatism in accounting, while loans to deposits a proxy of the banks' funding structure. Non-interest income to gross revenues is a measure of income diversification, while total non-interest expenses to gross revenues is a measure of the quality of management. Lastly, the ratio of bank assets to GDP proxies for 'too big to fail'. Another measure of bank-riskiness, the z-score, was not significant in any specification.

The country-specific variables contain real GDP growth, to proxy for the macroeconomic conditions; the sovereign credit rating and the market-to-book ratio for the stock market excluding financials, as proxies of the long-term prospects of the economy; and the index "Legal Structure and Security of Property Rights" from the Fraser Institute, a proxy for a country's institutional environment (Gwartney et al. [2010]). The rationale for the last proxy is that the quality of institutions may affect both the capacity and the incentives for monitoring and for exercising market discipline by all bank stakeholders (as discussed in Distinguin, Kouassi and Tarazi [2013] and Gilbert and Vaughan [2001]).

The sample is determined by ratings availability. There are relatively few observations for

LTDR until 2006. *BFSR*, in contrast, is available for a large number of banks since 2000. Taking additionally into account Moody's changes in the estimation of *BFSR* (Moody's 2007a), the sample period is chosen 2007 – 2013. We do not impose the restriction that a bank has information for all seven years. We do impose a filter, though, that at least five banks from a country exist, in order for the country's banks to be included in the sample. This is due to the use of country-fixed effects – we look at the within country variation. Nevertheless, the results are virtually the same without this filter.

From the above variables, the ratios loans to deposits and non-interest expense to gross revenues, plus the sovereign rating and the Fraser index, were not significant in any specification. For this reason, they are not included in the reported equations.

Table 1 provides some summary statistics, while table 2 the correlation matrix. As can be seen from table 2, there is no multicollinearity problem.

Table 1. Summary statistics, 2007 – 2013

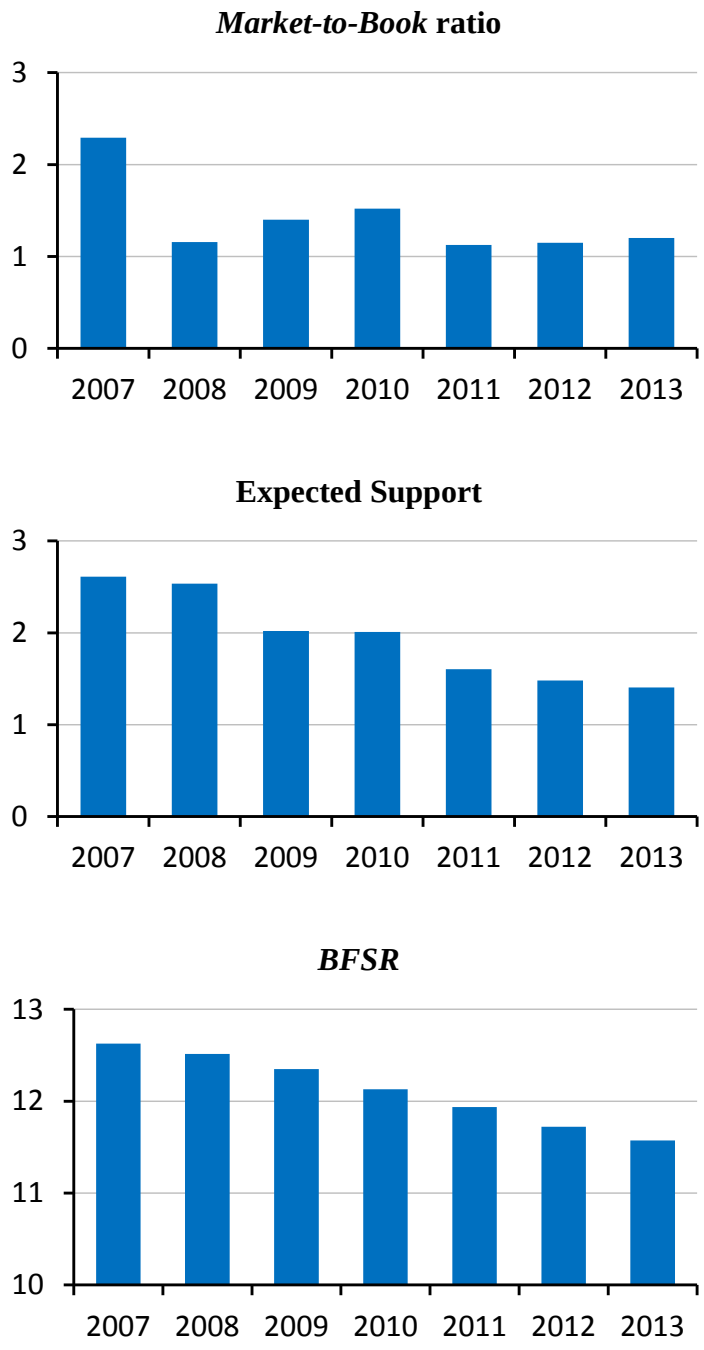
Variables	# of Obs.	Mean	Std. Dev	Min	Max
Price to book ratio	2506	1.317	.917	.04	5.928
Expected support	1808	1.995	1.682	0	7
Bank financial strength rating	6432	11.717	3.622	4	20
Real GDP growth [%]	13979	1.712	3.244	-10.51	11.352
Equity to total assets [%]	4852	8.342	5.229	.016	31.540
ROAA [%]	4573	.674	1.399	-6.360	5.461
Non-interest income to gross revenues	4623	.219	.136	-.088	.625
Non-interest expenses to gross revenues	4753	.365	.166	.027	.813
Loan-loss provisions to gross loans	3844	.012	.018	-.005	.113
Loans to deposits	4101	1.545	2.010	.150	15.091
Assets to GDP	3461	.233	1.014	0	13.231

Table 2. Pair-wise correlation matrix, 2007 – 2013

	Price to book ratio	Expected support	Bank financial strength rating	Real GDP growth	Equity to total assets	ROAA	Non-interest income to gross revenues	Non interest expenses to gross revenues	Loan-loss provisions to gross loans	Loans to deposits	Assets to GDP
Price to book ratio	1.000										
Expected support	0.115	1.000									
Bank financial strength rating	-0.006	-0.299	1.000								
Real GDP growth	0.375	0.143	-0.185	1.000							
Equity to total assets	0.187	-0.002	-0.357	0.245	1.000						
ROAA	0.360	0.091	-0.019	0.437	0.540	1.000					
Non-interest income to gross revenues	0.090	-0.118	0.083	0.059	0.156	0.247	1.000				
Non-interest expenses to gross revenues	-0.151	-0.086	-0.009	-0.161	-0.111	-0.235	0.448	1000			
Loan-loss provisions to gross loans	-0.003	-0.165	-0.338	-0.198	0.158	-0.314	-0.041	0.002	1.000		
Loans to deposits	-0.204	-0.125	0.138	-0.263	-0.072	-0.260	-0.160	-0.196	0.174	1.000	
Assets to GDP	-0.033	-0.064	0.325	-0.095	-0.245	-0.131	-0.022	-0.108	-0.078	0.125	1.000

Figure 1 shows the average values of the market-to-book ratio, the expected support and $BFSR$, by year. A cursory look reveals that there are not common trends in the yearly average values across the three variables.

Figure 1. *Market-to-Book*, Expected Support and *BFSR*, average values by year



1.4 Empirical analysis

The empirical results provide strong evidence that the expected government support does not weaken market discipline from bank shareholders. More interestingly, they highlight the counter-veiling forces on market discipline by bank shareholders. Briefly, for the riskier banks the expected support lowers the market-to-book ratio, but less so as the expected support increases. For the more prudent ones, the expected support is associated with higher market-to-book ratio. Yet, the overall picture suggests that this is not inconsistent with market discipline. Furthermore, market discipline did not weaken after the eruption of the global financial crisis in 2008.

Main results.

Table 3 summarizes the main results. It reports the estimated coefficients and their *t*-statistics (in parentheses) for the whole sample, and for two sub-samples. The first sub-sample contains the observations for which the stand-alone rating, *BFSR*, is below C-, the second those for which it is equal to or above C-. Splitting the sample in this way helps to differentiate the riskier banks, i.e., those with *BFSR* < C-, from the more prudent ones, i.e., those with *BFSR* ≥ C-. Note that the results were qualitatively the same for the three samples in the numerous robustness checks we performed, meaning, the same variables were significant in each sample.

For the whole sample, the coefficient of expected support is essentially zero, -0.008 with *t*-statistic -0.39. The expected support seemingly does not affect the market-to-book ratio, an indication that it does not erode market discipline from shareholders.

The remaining results, though as expected, are interesting for they highlight shareholders' risk-return trade-off. Specifically, the positive coefficient of *BFSR* (0.062, significant at the 1% level) and of the ratio loan-loss provisions to gross loans (6.444, significant at the 5% level) indicate that shareholders value prudent banks and more conservative loan-loss provisioning. On the other hand, the negative coefficient of the equity-to-assets ratio (-0.036, significant at the 1% level) – an indication that shareholders value leverage and its positive effects on ROAE— and the positive coefficient of ROAA (0.112, significant at the 1% level) indicate shareholders' appreciation of higher returns. In addition, shareholders seemingly value income differentiation, as indicated by the positive coefficient of the ratio non-interest income to gross revenues.

The conclusions hold for the riskier banks, although they are not as strong. Specifically, the coefficient of expected support, though it becomes more negative, remains insignificant. The coefficient of *BFSR* increases in absolute value, while the coefficients of equity to total assets

and ROAA decrease both in absolute value and in significance. Additionally, the ratio loan-loss provisions to gross loans declines in size and significance, while non-interest income to gross revenues becomes insignificant.

Table 3. Expected government support and bank valuation, 2007 – 2013

Regression results. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*-statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	All observations	**BFSR < C-**	**BFSR ≥ C-**
Expected support	-0.008	-0.018	0.046
	(-0.39)	(-0.63)	(1.59)
Bank financial strength rating (*BFSR*)	0.062***	0.094***	0.076***
	(5.41)	(3.02)	(3.64)
Equity to total assets [%] (lagged)	-0.036***	-0.030***	-0.060***
	(-4.50)	(-2.94)	(-3.69)
Return on average assets (*ROAA*) [%] (lagged)	0.112***	0.068*	0.404***
	(3.47)	(1.90)	(5.18)
Non-interest income to gross revenues (lagged)	0.496**	0.011	0.093
	(2.23)	(0.03)	(0.32)
Loan-loss provisions to gross loans (lagged)	6.444***	4.260*	18.625***
	(2.73)	(1.66)	(4.22)
Assets to GDP (lagged)	-0.032	0.466*	-0.134**
	(-0.49)	(1.69)	(-2.21)
Real GDP growth [%] (lagged)	0.009	0.003	0.025**
	(0.93)	(0.23)	(2.29)
Constant	0.399	1.614***	0.196
	(1.47)	(3.10)	(0.60)
# of Obs.	1343	646	697
# of Cross-sections	243	144	135
Adj. R^2	.56	.47	.73

The results are more interesting for the more prudent banks. Compared with those of the full sample, the higher coefficients (in absolute value) of *BFSR*, loan-loss provisions to gross loans, equity-to-assets and ROAA indicate that shareholders value prudence and higher returns more than indicated by the full-sample results.

The positive coefficient of the expected support (0.046, it just misses the 10% significance level) may at first glance indicate that the expected support weakens market discipline. On

closer inspection, however, it emerges that this is not necessarily so. For the more prudent banks, for which the stand-alone probability of default is smaller and hence the probability that support might be needed is smaller as well, shareholders may appreciate the extra benefits, such as, lower cost of funds, that the expected support brings.

Furthermore, the positive coefficient of expected support for the more prudent banks may be related to the asymmetric nature of market discipline. As Bliss and Flannery (2002) remark, "negative market signals indicate that investors may want management to make changes, whereas positive signals generally do not suggest that change is desired."

The above conclusions are quite robust. Additional explanatory variables, like the aforementioned total non-interest expenses to gross revenues, a proxy of efficiency, the sovereign credit rating, a proxy for the long-term prospects of the economy, and the Fraser index, a proxy of the quality of institutions, were not significant nor did they affect materially the significance of the variables included in the regression. The other proxy for the long-run prospects of the economy, i.e., the (contemporaneous) market-to-book ratio for the stock market excluding financials, is positive and significant at the 1% level. Yet, in all specifications, the coefficients of the other explanatory variables are virtually the same.

Further strengthening the case for market discipline, the inclusion of the long-term deposit rating, *LTDR*, in the regression instead of the expected support resulted in an insignificant coefficient for *LTDR* for all cases. The coefficient of the stand-alone rating, *BFSR*, remained positive. This indicates that shareholders take into account a bank's own strength in their calculations; not the rating that includes the expected support. The results are summarized in appendix table A3.

Shareholders' trade-off: Costs and benefits of expected support.

As discussed in the previous sections, there are two counter-veiling forces regarding the effect of expected support on market discipline by shareholders. On the one hand, shareholders recognize the beneficial effects of expected support, in terms of smaller probability of default and lower funding costs, which implies weaker market discipline by them. On the other hand, they also recognize the detrimental effects of weaker discipline by depositors and other bank-creditors, i.e., the capacity of bank-management to assume bigger risks, and the resultant higher probability of default. They also recognize the possibility that they may be wiped-out in case of default. This implies stronger market discipline.

One would expect that the higher the expected support, the stronger the effect of the first force. To test for this, we estimate the model with different sub-samples. The selection criterion is the size of the expected support: less than or equal to 2, to 3, to 4 and to 5. If the above expectation is correct, the evidence in favor of the market discipline should weaken as the size

of the expected support increases. The results are summarized in panel A of table 4. To save space, table 4 reports only the coefficients of the expected support and of *BFSR*. The complete results are in appendix table A4.

Table 4. Size of the expected support and market discipline, 2007 – 2013

Regression results for various sub-samples selected with criterion the size of the expected support. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*- statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	Sub-sample: Size of the expected support				
	≤ 2	**≤ 3**	**≤ 4**	**≤ 5**	**All obs.**
	Panel A: All banks				
Expected support	-0.065**	-0.077***	-0.032	-0.029	-0.008
	(-2.12)	(-2.87)	(-1.21)	(-1.20)	(-0.39)
Bank financial strength rating (*BFSR*)	0.065***	0.064***	0.065***	0.063***	0.062***
	(5.52)	(5.83)	(5.71)	(5.52)	(5.41)
# of Obs.	905	1148	1230	1285	1343
# of Cross-sections	194	219	230	238	243
Adj. R^2	.63	.60	.57	.56	.56
	Panel B: Riskier banks (*BFSR* < C-)				
Expected support	-0.153***	-0.134***	-0.065	-0.049	-0.018
	(-2.64)	(-2.94)	(-1.65)	(-1.42)	(-0.63)
Bank financial strength rating (*BFSR*)	0.073**	0.100***	0.074**	0.090***	0.094***
	(2.34)	(3.18)	(2.47)	(2.84)	(3.02)
# of Obs.	325	468	536	588	646
# of Cross-sections	94	115	129	136	144
Adj. R^2	.58	.50	.48	.46	.47
	Panel C: More prudent banks (*BFSR* ≥ C-)				
Expected support	0.070**	0.046*	0.053*	0.046	0.046
	(2.29)	(1.78)	(1.84)	(1.59)	(1.59)
Bank financial strength rating (*BFSR*)	0.098***	0.081***	0.079***	0.076***	0.076***
	(4.12)	(3.79)	(3.76)	(3.64)	(3.64)
# of Obs.	580	680	694	697	697
# of Cross-sections	122	134	134	135	135
Adj. R^2	.75	.75	.74	.74	.74

The results confirm this expectation, without, however, weakening the case for market discipline. In greater detail, for all banks (in panel A) the coefficient of expected support is negative and highly significant for expected support less than or equal to 3, and insignificant for higher values. Shareholders, recognizing that market discipline from debt-holders weakens as the expected support increases, are willing to pay less, except for the cases where the size of expected support is high. Even in this case, however, the coefficient of expected support remains negative though not significant. Note that the observations with expected support less than or equal to 3 constitute the bulk of the sample, 1148 out of 1343. Two other things stand out: the remarkable stability of the *BFSR*-coefficient across the five sub-samples; and the remarkable stability of the estimated equations (documented in appendix table A4).

For the riskier banks, i.e., those with *BFSR* < C- (in panel B), the evidence in favour of market discipline is even stronger: Shareholders, recognizing that market discipline from debt-holders weakens as the expected support increases, are willing to pay less for the riskier banks. The coefficient of expected support is -0.153 (significant at the 1% level) for expected support less than or equal to 2, and declines monotonically as the upper limit of expected support increases.

For the more prudent banks (in panel C), the coefficient of expected support is positive in all specifications, but significant at the 5% for expected support less than or equal to 2. Taking into account that $BFSR$ and the expected support add to $LTDR$, together with $LTDR$'s upper limit, the higher values of expected support are likely to be associated with lower values of $BFSR$. This may explain why the coefficient of expected support does not increase as the sample is expanded to include more observations.

We also examined whether market discipline weakened after the eruption of the crisis in 2008. The results are summarized in table 5, which has the same format as table 4.

In contrast to the existing literature, which documents that depositor discipline weakened during the crisis, we find that shareholder discipline did not. Rather the opposite, as the coefficient of expected support becomes insignificant –from positive— for the more prudent banks. Most likely, this is driven by the higher awareness of shareholders that they may not be spared losses even when the creditors of troubled institutions are protected.

Table 5. Size of the expected support and market discipline, 2008 – 2013

Regression results for various sub-samples selected with criterion the size of the expected support. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*- statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	Sub-sample: Size of the expected support				
	≤ 2	**≤ 3**	**≤ 4**	**≤ 5**	**All obs.**
			Panel A: All banks		
Expected support	-0.074**	-0.073***	-0.024	-0.025	-0.004
	(-2.56)	(-2.74)	(-0.87)	(-1.08)	(-0.19)
Bank financial strength rating (*BFSR*)	0.058***	0.058***	0.060***	0.057***	0.057***
	(5.21)	(5.54)	(5.36)	(5.24)	(5.22)
# of Obs.	806	1006	1078	1121	1163
# of Cross-sections	192	213	223	230	236
Adj. R^2	.61	.56	.53	.52	.52
			Panel B: Riskier banks (*BFSR* < C-)		
Expected support	-0.131**	-0.085*	-0.026	-0.027	0.001
	(-2.39)	(-1.92)	(-0.67)	(-0.85)	(0.02)
Bank financial strength rating (*BFSR*)	0.089***	0.116***	0.087***	0.080***	0.087***
	(3.08)	(4.10)	(3.07)	(2.97)	(3.27)
# of Obs.	302	427	488	529	571
# of Cross-sections	93	113	126	132	139
Adj. R^2	.50	.44	.41	.41	.41
			Panel C: More prudent banks (*BFSR* ≥ C-)		
Expected support	0.042	0.027	0.041	0.038	0.038
	(1.43)	(1.07)	(1.27)	(1.18)	(1.18)
Bank financial strength rating (*BFSR*)	0.091***	0.076***	0.075***	0.073***	0.073***
	(3.99)	(3.67)	(3.64)	(3.59)	(3.59)
# of Obs.	504	579	590	592	592
# of Cross-sections	121	130	130	131	131
Adj. R^2	.77	.75	.73	.73	.73

1.5 Concluding remarks

To summarize, the empirical results indicate that the expected government support of banks does not weaken market discipline by shareholders. Shareholders are not willing to pay more for banks with higher expected support. Actually, controlling for the expected support, they are willing to pay less for riskier banks. These results are in contrast with the evidence from the existing literature that the expected support weakens market discipline by depositors and other bank creditors. They are reasonable though, for shareholders are the first in line to incur losses in case of bank default – a case that the weaker discipline by the other suppliers of funds may make more likely.

Among the other notable results, shareholders seemingly value bank prudence and conservative loan-loss provisioning: They are willing to pay a higher price for banks with higher stand-alone ratings and higher loan-loss provisions. Also, contrary to other studies, we do not find that market discipline weakened after the eruption of the global financial crisis in 2008.

Viewed from another angle, the results are suggestive of shareholders' ability to evaluate a bank's true condition – the so-called ability to monitor. They cannot, however, answer whether shareholder discipline is strong enough to influence management decisions and promote financial stability. Nor whether the overall effect of expected support on market discipline, by all suppliers of funds, is positive or negative.

Among the policy implications, the results, and especially the negative effect of expected support on the market valuation of the riskier banks, add to the concerns that the strength of the perverse incentives created by the expected support may be smaller than usually thought. Indicative of these concerns, Ahmed, Anderson and Zarutskie (2015) and Antzoulatos and Tsoumas (2014) caution that the measures of the estimated funding advantage enjoyed by banks, thanks to the expected support, may over-estimate the true benefit to bank shareholders.

Another policy implication is that a promising way to promote financial stability seems to encourage banks to improve their own risk profile – which does not incorporate any external support in case of need; that is, to become more prudent. Shareholders will likely appreciate it, as suggested by the positive coefficient of expected support for the more prudent banks and by the finding that the stand-alone rating, which does not encompass any expected support, is a more appropriate measure of a bank's risk compared to the all-in-rating, which encompasses expected support.

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Appendix

Table A1. Mapping *BFSR* to standard credit ratings

Moody's ratings		Assigned numerical values
BFSR	Standard credit ratings	
A	Aaa	20
A-	Aa1	19
B+	Aa2	18
B	Aa3	17
B-	A1	16
C+	A2	15
C	A3	14
C-	Baa1	13
C-	Baa2	12
D+	Baa3	11
D+	Ba1	10
D	Ba2	9
D-	Ba3	8
E+	B1	7
E+	B2	6
E+	B3	5
E	Caa1	4
E	Caa2	3
E	Caa3	2
E	Ca	1
E	C	0

Notes. Source: Moody's (2007a). *BFSR*: Bank Financial Strength Rating.

Table A2. Variable definitions and sources

Variable	Definition	Source
Bank – specific variables		
Expected support	Difference between a bank's *all-in rating* (local currency long term deposit rating) and it's stand-alone rating (bank financial strength rating)	Bloomberg and Moody's
Bank financial strength rating ($BFSR$)	A bank's stand-alone rating	
Long term deposit rating ($LTDR$)	A bank's local currency long term deposit rating	
Price-to-book ratio	Ratio of a bank's stock market value to book value	Bloomberg
Equity to total assets	Ratio of a bank's equity to total assets	
ROAA	Return on average assets	
ROAE	Return on average equity	
Non-interest income to gross revenues	Ratio of a bank's non-interest income to gross revenues	
Total non-interest expenses to gross revenues	Ratio of a bank's non-interest expenses to gross revenues	
Loans to deposits	Ratio of a bank's loans to deposits	
Loan-loss provisions to gross loans	Ratio of a bank's loan-loss provisions to gross loans	
Assets to GDP	Ratio of a bank's assets to GDP	Bloomberg and World Bank
Country – specific variables		
Sovereign credit rating	The country's long term debt rating in local currency	Bloomberg and Moody's
Market-to-book ratio for the stock market	Market to book ratio of a country's stock market, excluding financials	Thomson-Reuters Datastream
Legal structure and property rights index (Fraser)	An index that measures a country's level regarding the rule of law, security of property rights, an independent and unbiased judiciary, and impartial and effective enforcement of the law.	Fraser Institute
Real GDP growth	Annual percentage growth rate of GDP at constant prices.	World Bank

Table A3. All-in ratings, stand-alone ratings and bank valuation, 2007 – 2013

Regression results. The dependent variable is the price-to-book ratio. The all-in rating is the long-term deposit rating in local currency, *LTDR*, while the stand-alone rating is the bank financial strength rating, *BFSR*. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*- statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	All observations	***BFSR* < C-**	***BFSR* ≥ C-**
Long term deposit rating (*LTDR*)	0.012 (0.94)	-0.002 (-0.09)	0.021 (1.42)
Bank financial strength rating (*BFSR*)	0.058*** (4.86)	0.102*** (3.34)	0.056** (2.54)
Equity to total assets [%] (lagged)	-0.035*** (-4.38)	-0.030*** (-2.88)	-0.063*** (-3.82)
Return on average assets (ROAA) [%] (lagged)	0.105*** (3.17)	0.066* (1.83)	0.388*** (4.81)
Non-interest income to gross revenues (lagged)	0.508** (2.28)	0.024 (0.07)	0.069 (0.24)
Loan-loss provisions to gross loans (lagged)	6.408*** (2.73)	4.261* (1.66)	18.351*** (4.13)
Assets to GDP (lagged)	-0.046 (-0.71)	0.456* (1.65)	-0.128** (-2.08)
Real GDP growth [%] (lagged)	0.007 (0.77)	0.003 (0.21)	0.023** (2.15)
Constant	0.376 (1.39)	1.530*** (2.99)	0.275 (0.90)
# of Obs.	1343	646	697
Cross-sections	243	144	135
Adj. R^2	.56	.47	.73

Table A4. Size of the expected support and market discipline, 2007 – 2013

Regression results for various sub-samples selected with criterion the size of the expected support. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*- statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	Sub-sample: Size of the expected support				
	≤ 2	**≤ 3**	**≤ 4**	**≤ 5**	**All obs.**
Expected support	-0.065**	-0.077***	-0.032	-0.029	-0.008
	(-2.12)	(-2.87)	(-1.21)	(-1.20)	(-0.39)
Bank financial strength rating (*BFSR*)	0.065***	0.064***	0.065***	0.063***	0.062***
	(5.52)	(5.83)	(5.71)	(5.52)	(5.41)
Equity to total assets [%] (lagged)	-0.034***	-0.037***	-0.034***	-0.034***	-0.036***
	(-3.42)	(-4.29)	(-4.21)	(-4.27)	(-4.50)
Return on average assets (ROAA) [%] (lagged)	0.073**	0.116***	0.092***	0.104***	0.112***
	(2.17)	(3.60)	(2.86)	(3.23)	(3.47)
Non-interest income to gross revenues (lagged)	0.520**	0.276	0.349	0.417*	0.496**
	(2.08)	(1.23)	(1.56)	(1.86)	(2.23)
Loan-loss provisions to gross loans (lagged)	5.367**	6.675***	6.366***	6.474***	6.444***
	(2.35)	(2.86)	(2.70)	(2.72)	(2.73)
Assets to GDP (lagged)	-0.009	0.004	-0.040	-0.028	-0.032
	(-0.12)	(0.07)	(-0.62)	(-0.43)	(-0.49)
Real GDP growth [%] (lagged)	0.004	0.005	0.006	0.008	0.009
	(0.39)	(0.57)	(0.61)	(0.86)	(0.93)
Constant	1.403***	-0.268	2.160***	1.314***	0.399
	(6.78)	(-1.37)	(10.41)	(5.85)	(1.47)
# of Obs.	905	1148	1230	1285	1343
# of Cross-sections	194	219	230	238	243
Adj. R^2	.63	.60	.57	.56	.56

Table B3. Expected government support and bank valuation, 2007 – 2013

Regression results. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. Market-to-book ratio (stock market) is a country's stock market ratio, excluding financials. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*-statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	All observations	**BFSR < C-**	**BFSR ≥ C-**
Expected support	-0.019	-0.032	0.038
	(-0.93)	(-1.09)	(1.34)
Bank financial strength rating (*BFSR*)	0.044***	0.078**	0.086***
	(3.82)	(2.36)	(4.36)
Market-to-book ratio (stock market)	0.464***	0.359***	0.585***
	(6.17)	(3.43)	(7.43)
Equity to total assets [%] (lagged)	-0.043***	-0.043***	-0.053***
	(-4.90)	(-4.00)	(-3.44)
Return on average assets (*ROAA*) [%] (lagged)	0.172***	0.162*	0.353***
	(5.04)	(4.23)	(4.84)
Non-interest income to gross revenues (lagged)	0.344	-0.408	-0.006
	(1.44)	(-0.93)	(-0.02)
Loan-loss provisions to gross loans (lagged)	9.835***	10.680***	14.229***
	(3.16)	(3.00)	(3.27)
Assets to GDP (lagged)	-0.009	0.567*	-0.159***
	(-0.14)	(1.91)	(-2.70)
Real GDP growth [%] (lagged)	-0.001	-0.000	0.004
	(-0.14)	(-0.04)	(0.38)
Constant	-1.184***	0.963*	-2.159***
	(-4.26)	(1.93)	(-5.39)
# of Obs.	1236	562	674
# of Cross-sections	215	122	128
Adj. R^2	.61	.53	.76

Table B4. Size of the expected support and market discipline, 2007 – 2013

Regression results for various sub-samples selected with criterion the size of the expected support. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. Market-to-book ratio (stock market) is a country's stock market ratio, excluding financials. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*-statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	Sub-sample: Size of the expected support				
	≤ 2	**≤ 3**	**≤ 4**	**≤ 5**	**All obs.**
	Panel A: All banks				
Expected support	-0.104***	-0.109***	-0.048*	-0.039	-0.019
	(-3.31)	(-4.20)	(-1.77)	(-1.59)	(-0.93)
Bank financial strength rating (*BFSR*)	0.043***	0.043***	0.045***	0.044***	0.044***
	(3.76)	(4.04)	(3.89)	(3.80)	(3.82)
# of Obs.	824	1053	1134	1184	1236
# of Cross-sections	170	194	204	210	215
Adj. R^2	.69	.66	.62	.61	.61
	Panel B: Riskier banks (*BFSR* < C-)				
Expected support	-0.216***	-0.195***	-0.087**	-0.062*	-0.032
	(-3.72)	(-4.87)	(-2.12)	(-1.79)	(-1.09)
Bank financial strength rating (*BFSR*)	0.044	0.080***	0.053	0.070***	0.078***
	(1.28)	(2.48)	(1.65)	(2.08)	(2.36)
# of Obs.	265	396	463	510	562
# of Cross-sections	77	96	109	114	122
Adj. R^2	.67	.61	.54	.53	.53
	Panel C: More prudent banks (*BFSR* ≥ C-)				
Expected support	0.070**	0.042	0.047	0.038	0.038
	(2.40)	(1.64)	(1.63)	(1.34)	(1.34)
Bank financial strength rating (*BFSR*)	0.111***	0.093***	0.090***	0.086***	0.086***
	(5.01)	(4.63)	(4.52)	(4.36)	(4.36)
# of Obs.	559	657	671	674	674
# of Cross-sections	115	127	127	128	128
Adj. R^2	.78	.77	.76	.76	.76

Table B5. Size of the expected support and market discipline, 2008 – 2013

Regression results for various sub-samples selected with criterion the size of the expected support. The dependent variable is the price-to-book ratio. Expected support is the numerical difference between a bank's long-term deposit rating in local currency, *LTDR*, and bank financial strength rating, *BFSR*. Market-to-book ratio (stock market) is a country's stock market ratio, excluding financials. All equations include country and year fixed-effects and are estimated using OLS with robust standard errors. Three (***), two (**) and one (*) asterisks denote significance at the 1%, 5%, and 10% levels, respectively. *t*-statistics are in parentheses. With the exception of *BFSR*, all variables are winsorized at the 1% level.

	Sub-sample: Size of the expected support				
	≤ 2	**≤ 3**	**≤ 4**	**≤ 5**	**All obs.**
			Panel A: All banks		
Expected support	-0.111***	-0.113***	-0.047*	-0.043*	-0.019
	(-3.72)	(-4.45)	(-1.69)	(-1.87)	(-0.98)
Bank financial strength rating (*BFSR*)	0.038***	0.038***	0.041***	0.039***	0.039***
	(3.55)	(3.73)	(3.57)	(3.50)	(3.60)
# of Obs.	736	925	997	1036	1074
# of Cross-sections	169	189	199	204	210
Adj. R^2	.67	.63	.58	.58	.57
			Panel B: Riskier banks (*BFSR* < C-)		
Expected support	-0.189***	-0.167***	-0.064	-0.055*	-0.023
	(-3.25)	(-4.04)	(-1.50)	(-1.72)	(-0.88)
Bank financial strength rating (*BFSR*)	0.056*	0.087***	0.060*	0.053*	0.064***
	(1.27)	(2.96)	(1.96)	(1.84)	(2.26)
# of Obs.	249	363	424	461	499
# of Cross-sections	77	95	108	112	119
Adj. R^2	.59	.56	.47	.47	.47
			Panel C: More prudent banks (*BFSR* ≥ C-)		
Expected support	0.048*	0.025	0.035	0.032	0.032
	(1.80)	(1.08)	(1.18)	(1.07)	(1.07)
Bank financial strength rating (*BFSR*)	0.102***	0.088***	0.086***	0.084***	0.084***
	(4.73)	(4.44)	(4.38)	(4.33)	(4.33)
# of Obs.	487	562	573	575	575
# of Cross-sections	114	123	123	124	124
Adj. R^2	.79	.78	.76	.76	.76

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Chapter 2

Loan-loss provisions under intrusive external monitoring
Evidence from US banks

Abstract

In this chapter, we exploit two sources of variation to shed new light on earnings management via loan-loss provisions (LLPs) and the associated trade-off between financial-statement transparency and financial stability: one, the intrusive external monitoring by funds that are members of the US Sustainability Investment Forum (USSIF), which reduces banks' leeway for earnings management; two, the regulatory shift towards more forward-looking provisions in the aftermath of the financial crisis, which increased it. The results, from a sample of more than 300 publicly-held US bank holding companies (henceforth banks), over the period 1999 – 2014, confirm that the banks under the intrusive monitoring exhibit less earnings management. Since, however, this differential behaviour got more pronounced after the regulatory shift, the results further suggest that USSIF funds induce provisioning behaviour that goes well beyond the stricter application of the existing accounting and supervisory rules, thus ameliorating the aforementioned trade-off.

2.1 Introduction

The global financial crisis of 2008 brought forcefully back to the fore the long-standing debate between accounting-standard setters and bank supervisors, regarding bank loan-loss provisions (LLPs). This debate involves the trade-off between two seemingly conflicting goals, that is, transparency of financial statements, on the one hand, and safety and soundness, on the other (Balla and Rose [2015, p.94). Yet, as this paper argues, the trade-off may not be as severe, for the two are not necessarily mutually exclusive when market forces operate efficiently.

In greater detail, the debate involves the incentives and leeway of bank managers in calculating LLPs and, hence, the reported earnings. LLPs are deducted from a period's pre-tax earnings to build reserves for loans that a bank's management expects that will not be repaid according to their contractual terms, thus causing a loss to the bank. The reserves cover for expected credit losses, while unexpected losses are absorbed by bank's equity. High leverage makes banks vulnerable to credit losses for which adequate reserves have not been built. Hence, provisioning is of paramount importance for financial stability.

Accounting-standard setters, like FASB in the US and IASB in Europe, with an eye on transparency, objectivity and comparability of banks' financial statements, prefer the so-called incurred-loss model. Bank supervisors, on the other hand, primarily concerned with financial stability and recognizing banks' inherent fragility, owing in part to high leverage, prefer the expected-loss model. Under the first, credit losses, and LLPs, should be recognized when an event that adversely affects a borrower's credit standing has occurred and the loss can be reasonably estimated. Under the second, credit losses should be recognized, and adequate reserves be built via LLPs, based on the expected deterioration of credit quality due to the changing economic conditions, even if at the moment there is not specific information about specific loans or borrowers. The rationale is that waiting for such information to arrive might be costly, for when it does it may be too late for a bank to build adequate reserves and impossible to absorb losses with its existing capital.

Another concern regarding the incurred-loss model is that delaying the recognition of credit losses may strengthen the procyclicality of the financial system. For a recent lucid exposition of this issue, as well as of the broader discussion, see Balla and Rose (2015). Briefly, during recessions, when the credit risks built-up during the expansions materialize, banks may be forced to curtail loans, thus exacerbating the recession and potentially leading to a vicious circle of worsening economic conditions, declining credit-worthiness, increasing LLPs and worsening bank conditions. Hence, to counter procyclicality, provisions should be high in expansions, when earnings are high, and low in recessions, when earnings are low.

LLPs are also related with earnings management. Both approaches, the backward-looking incurred-loss and the forward-looking expected-loss, allow banks a degree of judgment and considerable leeway in the estimation of LLPs, more so the expected-loss approach favored by

supervisors. More judgment and greater leeway, greater capacity for earnings management, less transparency, objectivity and comparability of banks' financial statements and, hence, more difficult external monitoring. With all its attendant risks for financial-market functioning and financial fragility.

Earnings management may arise for reasons that are not always strictly related to prudent behavior; namely, income smoothing, signaling and capital regulations (see, among others, Laeven and Majnoni [2003], Bikker and Metzemakers [2005], Gurcio and Hasan [2015] and Caporale et al. [2015]). Income smoothing refers to the practice of over-provisioning when earnings are high and under-provisioning when earnings are low, in an effort to attain income stability. It may be driven by managerial self-interest, concerns about financial fragility triggered by worsening investor perceptions, the desire to avoid supervisory scrutiny, as well as tax incentives. With signalling, higher LLPs are intended to convey to outsiders bank-managers' confidence about future earnings. Pertaining to capital requirements, banks may increase LLPs when their capital ratios are low, in order to build reserves for credit losses and, thus, avoid the potential costs of equity falling below regulatory standards pulled down by unexpected losses.

To detect the forces and motives behind LLPs, the existing literature follows a two-pronged strategy. This strategy involves the estimation of typical equations in which LLPs is regressed on earnings (usually before taxes and LLPs), change in earnings one period ahead, capital ratios, real GDP growth and contemporaneous change in loans (Packer and Zhu [2012]). Income smoothing is associated with a positive coefficient of earnings; signaling with a positive coefficient of earnings one period ahead; capital regulations with a negative coefficient of capital ratios; and procyclical behavior with a negative coefficient of real GDP growth and of the change in loans. For details, see Bushman and Williams (2012), Bouvatier, Lepetit and Strobel (2014), Caporale et al. (2015) and Curcio and Hasan (2015).

The strategy also exploits cross-sectional and time variation in factors potentially affecting banks' incentives and leeway for earnings management via LLPs. In multi-country studies, the cross-sectional variation pertains to country factors that are associated with the strength of supervision and market discipline, as in Fonseca and González (2008), Bushman and Williams (2012), Bouvatier, Lepetit and Strobel (2014) and Curcio and Hasan (2015). It may also be related to bank-specific factors associated with the strength of market discipline, as in Balla and Rose (2015) and Bouvatier, Lepetit and Strobel (2014). The connecting thread is that the stronger the supervision and market discipline, the weaker the incentives and the smaller the leeway for earnings management. In econometric terms, the smaller the values (in absolute terms) of the aforementioned coefficients. The time variation, in turn, in single-country studies (mostly with US banks), is associated with changes in regulations, as in Ahmed, Takeda and Thomas (1999), or in the focus of supervisors, as in Balla and Rose (2015), which also affect banks' incentives and leeway for earnings management.

For the purposes of this work, the findings and the logical underpinnings of the papers mentioned in the previous paragraph (and discussed in section 2) can be summarized in two testable hypotheses: a shift in supervisory and regulatory preferences towards more forward-looking, and hence more judgmental, LLPs is expected to be associated with more earnings management; stronger market discipline with less. To explore their validity, we exploit time variation in the emphasis of supervisors and accounting-standard setters, and cross-sectional variation in the degree of external monitoring.

The time variation pertains to the well-documented shift towards more forward-looking LLPs after the crisis of 2008. Dahl (2013), observing that the calls for more judgmental LLPs were endorsed by the Financial Stability Forum, the Basel Committee on Banking Supervision, IASB and FASB, powerfully remarks that 'provisions for loan losses were too judgmental in 1994 but not judgmental enough by 2009' (p. 3577). Our working hypothesis is that the rules concerning LLPs effectively changed in favor of forward-looking provisions, even before the necessary changes were fully implemented. A nod from supervisors and policy-makers was sufficient. Thus, the year of the shift is set to 2010.

This shift is expected to be associated with stronger income smoothing and signaling, and more so for banks subject to weaker market discipline. Alternatively, for banks subject to stronger market discipline –the factor driving cross-sectional variation— these changes are expected to be less pronounced. In this paper, such banks are those in which mutual funds that are members of USSIF have invested in their shares. USSIF stands for US Sustainability Investment Forum, US's membership association for socially and environmentally responsible investment professionals, firms, institutions and organizations. USSIF funds base their investment decisions on firms' ESG (Environment, Social, Governance) performance.

The USSIF funds compensate for the lack of readily available and reliable ESG data and ratings with an intrusive screening and monitoring process (for details, see Antzoulatos, Syrmos and Tsoumas [2015]). During this process there is active engagement of the top management of the funds and the firms –here, banks—, with annual and, occasionally, quarterly meetings. Our working hypothesis is that this process amounts to stronger monitoring and, hence, stronger market discipline. Thus, we expect that income smoothing and signaling will be weaker for the banks in which USSIF funds invest relative to the remaining banks. Moreover, after the said shift in supervisory and regulatory preferences, income smoothing and signaling will increase by less for banks in which USSIF funds invest (the time dimension).

Consistent with expectations, our results indicate that income smoothing was weaker for the USSIF banks, and more so after the shift towards more forward-looking LLPs. Moreover, while there is evidence of signaling for all banks, there is no such evidence for the USSIF banks. Quite the opposite! The negative coefficient of earnings one period ahead suggests forward-looking behavior. This behavior also got stronger after the shift. Overall, the results

indicate that the weaker earnings management by the banks under consideration is not driven, at least not entirely, by the stricter application of the then existing accounting rules, under the pressure of the USSIF funds. Part of it is likely driven by more prudent, forward-looking behavior which is consistent with financial stability.

The paper contributes to two branches of the literature, one referring to banking, the other to sustainability. In banking, it identifies another factor that may drive cross-sectional differences in loan-loss provisions, that is, the stronger discipline by knowledgeable and influential outsiders – here, the USSIF funds. Qualitatively, its effect is likely to be stronger than that based on country characteristics or characteristics of controlling shareholders or of supervisors which have been explored in the existing literature. Briefly, not all banks are affected equally by a country's overall institutional environment. Also, not all controlling shareholders behave in a way that weakens discipline by boards. Lastly, supervisors may not apply the rules consistently across banks and over time. In contrast, USSIF funds are more likely to apply their screening and monitoring criteria consistently across banks and over time. The paper also contributes to the emerging literature on sustainability, for it identifies an additional benefit of sustainable practices by banks: more reliable, yet forward-looking, provisioning practices and, hence, performance indicators. This implies a better balance and a less severe trade-off between transparency and financial stability.

The remainder of the paper is organized as follows. Section 2 begins with a brief review of the papers that are more relevant to this work. Then, it discusses the issue of external monitoring by USSIF funds, the factor that drives here the cross-sectional variation. Section 3 discusses the econometric approach and the data. Section 4 presents the results, while section 5 concludes.

2.2 Exploiting cross – sectional and time variations

Existing literature.

Ahmed, Takeda and Thomas (1999) examine whether the 1990 change in capital adequacy regulations affected the hypothesis that loan-loss provisions are used for earnings management. In particular, under the 1990 change in capital requirements, loan-loss reserves and thus loan-loss provisions, didn't count as part of Tier I or primary capital. This change implied that if earnings smoothing is an important driver of loan-loss provisions, they would expect to observe a positive and significant coefficient on earnings (before taxes and loan-loss provisions) in the new regime, since increasing earnings by reducing loan-loss provisions could be less costly. Using a sample of 113 US bank holding companies that file Y – 9 reports

with the Federal Reserve over 1986 – 1995, they find that the relation between earnings (before taxes and loan-loss provisions) and loan-loss provisions is insignificant. Also, testing whether loan-loss provisions are related to future earnings changes, they find a negative and statistically significant coefficient on the one year - ahead change in earnings, indicating that banks don't use loan-loss provisions to signal their financial strength.

Laeven and Majnoni (2003) explore the cyclical patterns of bank loan-loss provisions followed by commercial banks in different geographical areas of the world. The sample used in this paper consists of 1419 banks from 45 countries, for the period 1988 – 1999. This period captures both the economic slowdown in the USA of the early 1990s and the following upswing in the mid and late 1990s. For other countries this period captures at least one business cycle, and for certain countries, notably the East Asian countries, an economic crisis (during 1997 – 1998). They find a positive and significant relationship between bank earnings and loan-loss provisions, suggesting that banks in the sample have exercised income smoothing. In order to allow for an asymmetric pattern of loan-loss provisions during periods of positive and negative earnings, they interact the earnings variable with a dummy variable that takes value of one when earnings are negative and zero otherwise. The results indicate that banks make statistically significantly higher provisions when they incur losses than when they generate a positive level of income before provisions and tax. This implies that bankers on average create too little provisions in good times and are then forced to increase them during cyclical downturns, magnifying losses and the size of negative capital shocks. They also find a negative relationship between loan growth rate and loan-loss provisions with the rationale being a less prudent bank behavior during periods of rapid credit growth, and a negative relationship between GDP growth and loan-loss provisions, suggesting that banks provision during and not before economic recessions.

Bikker and Metzemakers (2005) investigate the provisioning behavior of banks and their dependency on the business cycle. They distinguish two causal channels from the business cycle to provisioning. First, credit risk is linked to the phase of the cycle, which means that risk increases in a downturn and vice versa. Provisioning during a downturn diminishes a larger part of profits when more resources are needed for capital. Second, provisioning may depend on earnings, as assumed in the income smoothing hypothesis. Such provisioning would reduce the procyclical behavior. By using 8,000 bank year observations from 29 OECD countries over the period 1991 – 2001, they find evidence that provisions depend significantly on the business cycle. Specifically, the GDP growth coefficient is negative, indicating that provisions rise when business cycle falls. This procyclical behavior is mitigated by the impact of banks' earnings on provisions, as the relationship between earnings and loan-loss provisions is significant and positive, meaning that banks do provision more (less) when earnings are high (low). Last, they find that loan growth as a proxy of increased credit risk

appears to be significant as a determinant of provisioning, which means that risks are built up during economic upturns.

Fonseca and Gonzalez (2008) add one more dimension to the analysis: whether income smoothing varies across countries depending on institutions, regulation, supervision, financial structure and financial development. Specifically, they use a panel database of 4,546 bank year observations from 41 countries. Their empirical analysis consists of two stages. In the first stage, they test the income hypothesis for each country. Loan-loss provisions are the dependent variable and earnings (before taxes and loan-loss provision) are the explanatory variable of interest. Their results show evidence of income smoothing in 14 countries ((Brazil, Chile, Denmark, Egypt, Italy, Kenya, Korea, Peru, Philippines, Portugal, Spain, Sweden, USA and Venezuela). In the second stage, they test the influence of country variables on the intensity of bank income smoothing and run a regression in which the dependent variable is the earnings variable coefficient obtained for each country in the first stage. The explanatory variables of bank income smoothing in this stage are the type of investor protection, accounting disclosure, regulation, supervision, financial structure and financial development of each country. They find that earnings smoothing incentives increase in line with market orientation and development of the financial system, and in contrast, these incentives fall in line with restriction on bank activities and private supervision.

El Sood's (2012) evidence is supportive of the income smoothing hypothesis. Sood investigates whether loan-loss provisions of 878 US bank holding companies are affected by income smoothing during the period 2001 – 2009. She finds a positive and significant relationship between loan-loss provisions (dependent variable) and the net income (before extraordinary items, taxes and loan-loss provisions), confirming the income smoothing hypothesis. Also, she finds a negative relationship between loan growth and loan-loss provisions, providing evidence on procyclicality of loan-loss provisions, as banks tend to increase loans in periods of a rising economy and shrink loans at times of recessions. Furthermore, Sood explores whether bank holdings companies are motivated to smooth income through loan-loss provisions when they are (1) going through a recession and (2) are more profitable. She uses two dummy variables, one that equals 1 if the year is recessionary and zero otherwise, and a second that equals 1 if the bank holding company has an above median net income (before extraordinary items, taxes and loan-loss provisions) and zero otherwise. Particularly, by interacting both dummy variables with the net income variable, Sood finds that banks delay provisioning process during recessionary periods and increase income smoothing when they are more profitable.

Closely related to earnings management through loan-loss provisions, Bushman and Williams (2012) empirically explore the level of accounting discretion across countries and how it affects discipline over bank risk taking. By using a large sample of banks from 27

countries, they estimate two distinct measures of discretionary provisioning. The first measure is smoothing, defined as the coefficient from a regression of loan-loss provisions on contemporaneous earnings, after controlling for non discretionary determinants. They find a positive and significant coefficient, indicating that that on average banks around the world smooth earnings through loan-loss provisions. The second measure uses a future outcome variable to isolate the extent to which explicit forward looking information is reflected in current loan-loss provisioning within a country. They use the coefficient from regressing current period loan-loss provisions on next year's change in non - performing loans. They find a positive coefficient, indicating that banks on average anticipate future deterioration in the performance of the loan portfolio. Discipline over risk taking is examined using two approaches. The first estimates the impact of the two provisioning measures on the relation between changes in asset volatility and changes in bank leverage. The second investigates relations between provisioning and bank risk shifting. Both of these approaches provide evidence that discretionary provision in the form of earnings smoothing reduces discipline on bank risk taking, and in contrast, provisioning that captures the extent to which provisions explicitly anticipate future deterioration in non - performing loans is associated with stronger discipline on bank risk taking.

Curcio and Hasan (2015) shed light on the relationship between loan-loss provisions and earnings management for European banks. Also, they examine whether loan-loss provisions signal management's expectation about future bank profits. They use a sample of 491 banks over the period 1996 – 2006, comparing banks from Euro Area (EA) countries and banks from countries where the Euro currency is not used. They conduct the same analysis for the period 2007 – 2010, with a restricted sample of 195 banks. For the period 1996 – 2006, they find a positive and significant relationship between loan-loss provisions and earnings (before taxes and loan-loss provisions) for the EA banks, thus supporting the income smoothing hypothesis, whereas it is positive and not statistically significant for the non EA banks. For the non discretionary component of loan-loss provisions, they find a positive and significant coefficient of non-performing loans, for both EA and non EA banks, indicating a direct relationship between loan-loss provisions and the deterioration in the banks' credit portfolio quality. The variable used to test the signaling hypothesis is the one year ahead change in earnings (before taxes and loan-loss provisions). They find a negative and significant coefficient for EA banks and a positive and significant coefficient for non EA banks, indicating that only non EA banks use loan-loss provisions to signal information about their future earnings to the market. During the financial crisis, EA banks continue to be concerned about the quality of their loan portfolio (positive coefficient of non-performing loans), but in contrast, they stop using loan-loss provisions to stabilize their income. Lastly, they find that non EA banks engaged in income smoothing during the crisis, as also the relationship between

loan-loss provisions and non performing loans still remains positive.

Balla and Rose (2015) explore the relationship between earnings and loan-loss provisioning following the 1998 SunTrust decision by the Securities and Exchange Commission (SEC) that indicated stricter enforcement of accounting priorities relative to supervisory priorities. Their dataset includes 640,000 bank quarter observations for 13,916 banks, both publicly and privately held. They use two sample periods, a short term period that includes eight quarters before and eight quarters after the fourth quarter of 1998, and a long term period, starting from the first quarter of 1992 till the fourth quarter of 2013. The main dependent variable is the level of loan-loss provisions. Publicly and privately held banks are distinguished by a dummy variable which equals one for publicly held banks and zero otherwise. In order to control for the quarters after the SEC action, they define a dummy variable that equals one for the quarters following the SEC action and zero otherwise. The main explanatory variable is pre provision net revenue, referring to the earnings variable commonly used throughout the literature. Other explanatory variables used include controls for bank balance sheet and income statement variables related to provisioning, such as the level of non-performing loans, the change in loans growth, the ratio of equity to total assets, the bank size and the level of net charge offs. They find that in the two years following the SEC action, the relationship between earnings and provisions weakened for publicly held banks but not for privately held banks, in accordance with a tightening of accounting constraints affecting only publicly held banks. For the long term, both publicly and privately held banks demonstrate a weakening of this relationship, consistent with the incurred loss framework accounting standards.

Caporale et al. (2015) use data from a panel of more than 400 banks Italian banks for the period 2001 – 2012 to examine the main determinants of loan-loss provisions. For the discretionary determinants, they test the income smoothing hypothesis through the coefficient on earnings (before interest, taxes and loan-loss provisions), and the loan-loss provisions signaling hypothesis through the coefficient on one year ahead change of earnings (before interest, taxes and loan-loss provisions). For the non discretionary determinants, they use the level of non-performing loans, the rate of change of non-performing loans and the level of total loans, as proxies of bank credit risk. To proxy for the economic cycle, they use the annual growth rate of real per capita GDP. Lastly, they add a dummy variable that equals one for the period 2008 - 2012 and zero otherwise, to control for the financial crisis period. Overall, they don’t find evidence supporting the income smoothing hypothesis, as also the signaling hypothesis. On the contrary, their results show that loan-loss provisions in Italian banks are driven mainly by cyclical and non discretionary determinants.

Bouvatier, Lepetit and Strobel (2014) explore the relationship between corporate governance and earnings management by analyzing if ownership concentration, as measured at the bank

level, is an important determinant of earnings management. They further examine whether the existing regulatory environment (country level variation) is limiting the potential discretionary income smoothing behavior of banks with high levels of ownership concentration. They use a sample of 873 European commercial banks, which covers the period 2004 – 2009. Their dataset provide a good amount of variability between individual levels of ownership concentration given the lack of regulatory limitations on the percentage of bank capital owned by a single entity in Europe. They posit that income smoothing should be stronger in banks with more concentrated ownership, which weakens market discipline by the boards; and weaker in countries with stronger regulatory regimes and better audit quality – the first increases supervisory discipline, the second strengthens market discipline and both reduce banks' leeway to manage earnings. Consistent with expectations, they find that banks with a more concentrated ownership structure use discretionary LLP to smooth their income. However, this behavior is mitigated in countries with stronger supervisory regimes or higher quality of external audits, but independent of the level of shareholder protection, the type of the majority shareholder, the level of bank risk and the level of non-insured debt.

This paper.

Our working hypothesis is that banks in which USSIF funds invest are subject to stricter external monitoring. Hence, everything else equal, these banks will have smaller leeway in managing earnings, which implies less smoothing and less signaling.

As Antzoulatos, Syrmos and Tsoumas (2015) remark, socially responsible investors have a more forward-looking approach and longer investment horizons than typical institutional investors. They identify and select companies with a "growth mindset", as well as with a strong track record on successful adaptation to new challenges and learning from their mistakes. They also select companies with broader characteristics than just "appropriate balance sheet performance metrics". Further, owing to their intrusive selection and monitoring process, they have a bigger capacity to screen and monitor the firms in which they invest, and to influence their decisions.

A relevant question is why banks are willing to incur the cost and restrictions associated with this monitoring. The literature has identified several potential benefits. Briefly, better reputation, which is associated with more stable sources of funding by depositors and investors with long horizons –like the USSIF funds—; attracting higher quality customers; retaining better employees; better pricing of products and services; plus lower costs from the increased transparency (Cheng, Oikonomou and Serafeim [2014], Khan, Serafeim and Yoon [2015]). To these one can also add the benefits from stronger controls (Ellul and Yerramilli [2013]). Recent findings confirm that these banks exhibit better financial performance, that is, higher ROE and

ROA, and enjoy higher valuation that cannot be entirely explained by the higher ROE and ROA (Wu and Shen [2013], Antzoulatos, Syrmos and Tsoumas [2015]).

Having no information to judge USSIF funds' criteria regarding banks, we use SASB's Sustainability Map[1] as a guide. This is not unreasonable as industry working groups, comprised of industry experts, have provided extensive input into the identification of material issues and the development of the 'Map' (for more details, see Khan, Serafeim and Yoon [2015]). SASB, which stands for Sustainability Accounting Standards Board, is an independent 501(c) non-profit organization, with mission to develop and disseminate sustainability accounting standards that help public corporations disclose material, decision- useful information to investors. The Standards for commercial banks (provisional version, February 2014) identify several issues that come under five groupings: 'financial inclusion and capacity building', 'customer privacy and data security', 'management of the legal and regulatory environment', 'systemic risk management' and 'integration of environmental, social and governance risk factors in credit risk analysis'. The last three seemingly are the most relevant to this work.

2.3 Econometric issues

Equation.

Following the literature, we estimate the equation

$$\frac{LLP_{i,t}}{Assets_{i,t-1}} = \alpha \frac{Earnings_{i,t}}{Assets_{i,t-1}} + \beta \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}} + \gamma \frac{\Delta Loans_{i,t}}{Assets_{i,t-1}} + \delta \frac{Equity_{i,t}}{Assets_{i,t-1}} + \varepsilon ln(Assets_t) + b_i + z_t + u_{i,t} \quad (1)$$

where i and t respectively denote banks and time; LLP stands for loan-loss provisions, $Assets$ for total assets, $Earnings$ for net income before taxes and provisions, $\Delta Earnings_{i,t+1}$ for the one-period ahead change in earnings, $\Delta Loans_{i,t}$ for the change in loans from the previous period, and $Equity$ for bank's book equity; $ln(Assets_t)$, the logarithm of total assets, is a proxy of size, while b_i and z_t denote bank and time fixed-effects. In the literature, instead of the unweighted capital ratio equity over assets, the ratio equity over risk-weighted assets is often used. In our sample, owing to the missing values of this ratio, the number of observations declines by about 15%. But the results are virtually the same.

[1] See http://www.sasb.org/materiality/sasb-materiality-map/.

A positive α would indicate income smoothing, a positive β signalling but a negative one forward-looking provisioning, a negative γ procyclical loan-loans provisioning, while a negative δ would indicate loan-loss provisioning driven by capital concerns. More details will be provided in the discussion of the results, as need arises. To evaluate the economic significance of each explanatory variable, we calculate its elasticity at the mean; that is, its estimated coefficient multiplied with its mean value and divided by the mean value of the dependent variable.

To test for the differential effects of the change in the regulatory preferences after the onset of the crisis and of stronger external monitoring by USSIF funds, we calculate the dummy variables

$$D_t^{2010-2014} = \begin{cases} 1 \ \ if \ t \geq 2010; \\ 0 \text{ otherwise} \end{cases}$$

and

$$D_{i,t}^{USSIF} = \begin{cases} 1 \ \ if \text{ a USSIF fund has invested on bank's } i \text{ stock in year } t; \\ 0 \text{ otherwise} \end{cases}$$

The first dummy variable marks the years for which the shift towards more forward-looking LLPs had taken place, while the second identifies the bank-years at which a USSIF fund has invested in a particular bank.

To explore whether the shift affected income smoothing and signaling for all banks, we add in equation (1) the terms

$$D_t^{2010-2014} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$$

and

$$D_t^{2010-2014} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}.$$

A positive coefficient of the first will be consistent with more income smoothing by all sample banks, while a negative coefficient of the second with less signaling and –possibly— more forward-looking behavior after the shift to the new supervisory focus. And vice-versa.

To explore whether the stronger external monitoring by USSIF funds affected income smoothing and signaling, we add the terms

$$D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$$

and

$$D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$$

A negative coefficient of the first will indicate less income smoothing by the banks in which USSIF funds invest relative to the other banks, while a negative coefficient of the second less signaling and –possibly— more forward-looking provisioning. And vice-versa.

Lastly, to test for the combined effect of the new regulatory focus and the effect of the stricter monitoring by USSIF funds, in the last specification we further add the terms

$$D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$$

and

$$D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$$

A negative coefficient of the first will indicate even less income smoothing for the banks in which USSIF funds invest relative to the other banks after the shift in regulatory focus, while a negative coefficient of the second even less signaling and –possibly— even more forward-looking provisioning.

The choice of 2010 as the year at which the change in regulatory preferences took place is based on the public dialogue about the need for more forward-looking LLPs, that followed the onset of the crisis. Dahl (2013, p. 3577) refers to the recommendation of the Financial Stability Forum in 2009 to give banks more latitude to exercise "reasonable judgments" in deciding about LLPs; and to the recommendation of the U.S. Treasury, also in 2009, for more forward-looking provisions. Balla and Rose (2015, p. 96) refer to a statement in the same spirit by the then Governor of the US Federal Reserve, Ben Bernanke, in March 2009; and a formal encouragement of accounting standard-setting bodies, by the Basel Committee on Bank Supervision, for more forward-looking provisions. Even the leaders of the 20 biggest economies, decided in April 2009

> "…to call on the accounting standard setters to work urgently with supervisors and regulators to improve standards on valuation and provisioning and achieve a single set of high-quality global accounting standards;''[2]

as part of their efforts to strengthen financial system supervision and regulation.

[2] London Summit – Leaders' Statement, April 2, 2009, (www.imf.org/external/np/sec/pr/2009/pdf/q20_040209.pdf)

Data.

The list of USSIF funds is obtained from the Sustainable and Responsible Mutual Fund Chart on May 15, 2015. Nevertheless, we cross-checked the May 2015 Sustainable Funds list with various previous lists provided through USSIF in their biannual Trends Reports from 1997 until 2014, in order to ensure that no fund is included in our sample before becoming a USSIF-member. We identify the banks in which USSIF funds invest from the 'Schedule of Portfolio Investments' of the funds' quarterly SEC Filings, mainly the forms N-Q (SEC2455) and N-CSR (SEC2564).

The data for US listed bank holding companies come from the FDIC (Y-9C)-call reports, for the period 1999Q1 – 20014Q4. In our yearly estimation we use Q4 data. The starting period is dictated by the availability of data from USSIF. For further information, refer to USSIF's "Current and Past Trend Reports" section available at www.ussif.org. We examine banks listed in a major US market, 303 banks with 2,674 yearly observations. From the sample banks, 81 have been included in a sustainable fund's quarterly portfolio holdings at least once, about 26.7% of the total, while the relevant bank-years are 451 about 16.9% of all observations. These bank-years are identified by the $D_{i,t}^{USSIF}$ dummy.

As table 1 indicates, banks in which USSIF funds invest, tend to have lower LLPs, lower one year ahead earnings before taxes and provisions, smaller change in loans and more assets. Whether the lower LLPs reflect less prudent provisioning behavior by these banks or the better quality of their loan portfolios, we cannot tell. Yet, the evidence in Antzoulatos, Syrmos and Tsoumas (2015) is consistent with the second. Specifically, they find that these banks are characterized by superior performance, indicated by higher ROE, ROA and market-to-book ratio; more prudent behavior, indicated by lower ratios of risk-weighted assets to total assets; and a business model oriented towards financing industry and commerce.

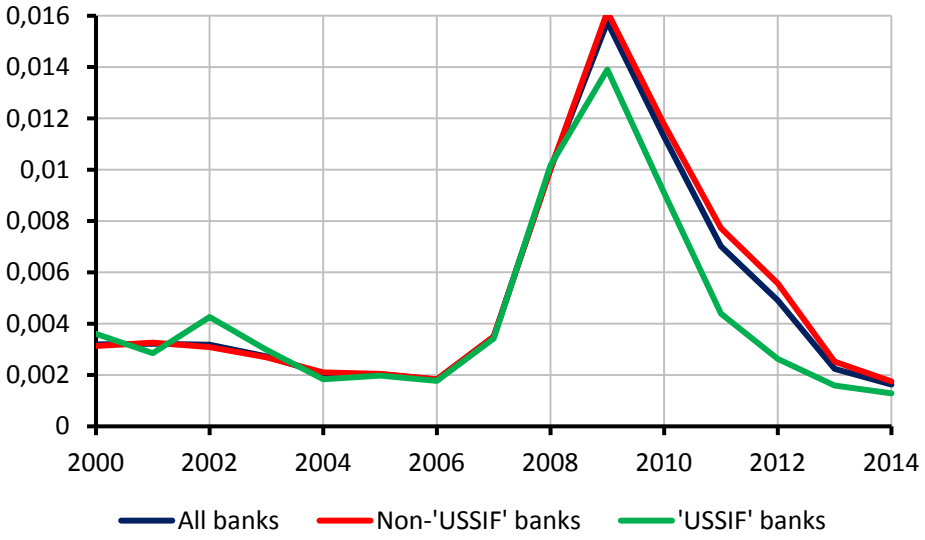
The lower LLPs are shown in figure 1, which plots the dependent variable $\frac{LLP_{i,t}}{Assets_{i,t-1}}$. The difference between the 'USSIF' banks and the others got more pronounced after 2008. Figure 1 also reveals that LLPs were very high during the turbulent years 2008 – 2010, at the height of the financial crisis.

Table 1. Summary statistics

The table reports descriptive statistics for the variables employed in the analysis. The sample period is 1999 – 2014 for all available public banks in FDIC's call reports. USSIF stands for the US Sustainability Investment Forum (USSIF).

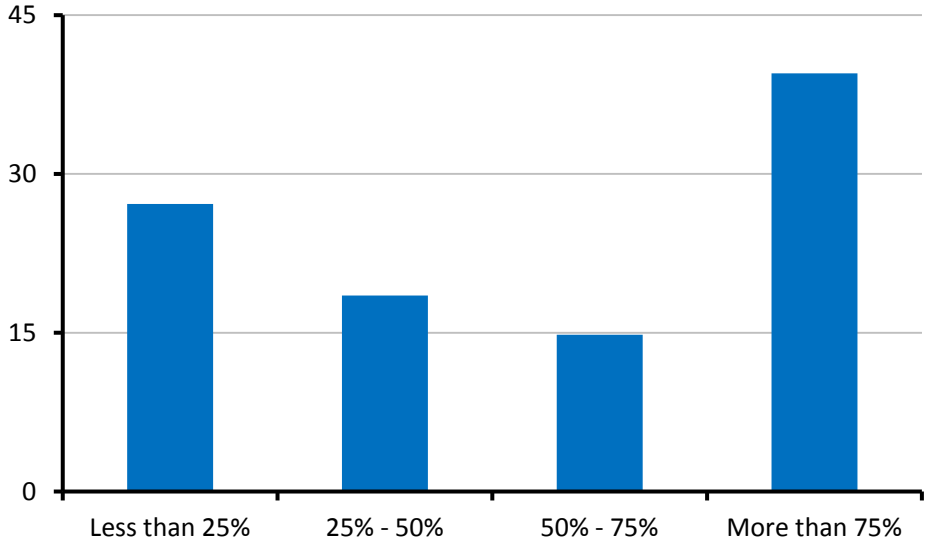
Variables	# of Obs.	Mean	Std. Dev	Min	Max
All bank-years					
Loan-loss provisions (LLPs), scaled by lagged total assets	2674	0.0055	0.0077	0.000	0.0675
Earnings before taxes and LLPs, scaled by lagged total assets	2674	0.0217	0.174	.0003	0.2667
One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	2674	0.0025	0.0178	-0.1494	0.1875
The change of total loans between t and $t-1$, scaled by lagged total assets	2674	0.0661	0.1228	-0.3594	1.337
Total equity to lagged total assets	2674	0.1041	0.0478	0.0051	0.8780
Natural log of total assets	2674	14.80	1.563	12.04	20.99
Bank-years for which USSIF funds have invested in banks					
Loan-loss provisions (LLPs), scaled by lagged total assets	453	0.0049	.0066	0.000	0.0504
Earnings before taxes and LLPs, scaled by lagged total assets	453	0.0210	0.092	0.0008	0.0773
One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	453	0.0014	0.0105	-0.0610	0.0756
The change of total loans between t and $t-1$, scaled by lagged total assets	453	0.0530	0.0924	-0.2367	0.7728
Total equity to lagged total assets	453	0.1097	0.0282	0.0563	0.2902
Natural log of total assets	453	16.78	1.427	14.51	20.99

Figure 1. Loan-loss provisions over (lagged) total assets



To get an idea about the variability of the $D_{i,t}^{USSIF}$ dummy, and hence check whether there is any additional bank-specific variation that can be exploited in addition to that captured by the bank fixed effects, we calculate the percent of the sample years for which a USSIF fund has invested in a particular bank. For example, if a bank has ten observations, and for seven of them a USSIF fund has invested in its shares, it is 70%. Figure 2 presents the histogram of this variable. For 60% of the USSIF banks, the said percentage is less than 75%. Nevertheless, the inclusion of bank fixed effects, which is justified by the appropriate Hausman test, makes harder to uncover any evidence of differential behavior by 'USSIF' banks – something that lends more credibility to the results below.

Figure 2. Histogram – Percent of sample years a USSIF fund has invested in a bank



Lastly, table 2, which exhibits the cross-correlation table, indicates that multicollinearity is not a problem.

Table 2. Cross-correlation matrix

The table reports the correlation matrix of the dependent and the control variables for the period 1999 – 2014. *LLP* stands for loan-loss provisions, $Assets$ for total assets, $Earnings$ for net income before taxes and provisions, $\Delta Earnings_{i,t+1}$ for the one-period ahead change in earnings, $\Delta Loans_{i,t}$ for the change in loans from the previous period, and $Equity$ for bank's book equity; $ln(Assets_t)$ is the logarithm of total assets.

	$\frac{LLP_{i,t}}{Assets_{i,t-1}}$	$\frac{Earnings_{i,t}}{Assets_{i,t-1}}$	$\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$	$\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}$	$\frac{Equity_{i,t}}{Assets_{i,t-1}}$	$ln(Assets_t)$
$\frac{LLP_{i,t}}{Assets_{i,t-1}}$	1.000					
$\frac{Earnings_{i,t}}{Assets_{i,t-1}}$	0.505	1.000				
$\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$	-0.235	-0.295	1.000			
$\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}$	-0.214	-0.020	0.228	1.000		
$\frac{Equity_{i,t}}{Assets_{i,t-1}}$	-0.103	0.447	0.139	0.298	1.000	
$ln(Assets_t)$	0.075	0.040	-0.011	-0.045	0.125	1.000

2.4 Empirical results

The results are consistent with expectations. The banks in which USSIF funds invest exhibit lower income smoothing and no signaling. Specifically, the coefficient of earnings is positive but smaller than that for the whole sample. This may be due to more 'sincere' LLPs or to stricter application of the regulations concerning LLPs – both of which are consistent with stronger market discipline. As for the coefficient of the change in earnings one period ahead, it is negative, while that for the whole sample is positive. This negative coefficient is consistent with forward-looking behavior which, in turn, is consistent with stronger market discipline.

More interestingly, after the shift in the regulatory preferences, the coefficients of both earnings and change of earnings one period ahead declined further relative to that of the whole

sample. The two together indicate that the smaller income smoothing was not entirely driven by stricter application of the regulations concerning LLPs. Part of it can be attributed to more forward-looking, yet prudent, provisioning by the banks under examination.

Main results.

Table 3 summarizes the main results. The first model corresponds to equation (1), while the remaining three to the extensions that aim to explore the effects of the shift in supervisory preferences and of the stronger external monitoring of banks by USSIF funds. All estimated equations include time and bank fixed effects, while the robust standards errors are clustered at the bank level.

The estimated coefficients reveal that there is income smoothing, signaling, countercyclical behavior and management of capital ratios. However, from these effects only the first and the last are economically significant. But the last one is not significant in all specifications.

Starting with the typical model in column (1), the positive coefficient of $Earnings_{i,t}/Assets_{i,t-1}$, 0.334 with a *t*-statistic 15.60, indicates that there is income smoothing. Its elasticity at the mean, 0.334*0.0217/0.0055 = 1.34, suggests that this variable is economically significant as well.

The positive, and significant at the 1% level, coefficient of $\Delta Earnings_{i,t+1}/Assets_{i,t-1}$, is consistent with signaling. Economically, though, signaling is not significant, as the elasticity at the mean is only 0.0145 (=0.032*0.0025/0.005). Similarly, the evidence of countercyclical behavior, coefficient -0.005 with *t*-statistic -2.90 of $\Delta Loans_{i,t}/Assets_{i,t-1}$, is not economically significant: the elasticity at the mean is only about 0.06.

The negative coefficient of $Equity_{i,t}/Assets_{i,t-1}$ is consistent with managing the capital ratios. Moreover, its elasticity at the means, about 0.25, suggests that its effect is economically significant as well.

The model in column (2) presents the results of the test whether the shift in regulatory preferences affected income smoothing and signaling. The coefficients of the variables in the base model above are essentially the same. The coefficient of the term $D_t^{2010-2014} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$ is virtually zero. Seemingly, for the whole sample, the shift did not lead to more income smoothing. Perhaps, it is due to the tumultuous period following the financial crisis.

Table 3. Main results

In each regression, the dependent variable is loan-loss provisions (LLPs) scaled by lagged total assets. The dummy variable $D_t^{2010-2014}$ takes the value one for the years 2010 – 2014; and zero for the other years. The dummy variable $D_{i,t}^{USSIF}$ takes the value one if a USSIF fund has invested in the shares of bank *i* at year *t.* For the definitions of the other explanatory variables see table 2. Standard errors are heteroskedasticity-robust and clustered at the bank level. *t*-statistics are reported in parentheses. Three, two and one asterisks, ***, ** and *, denote statistical significance at the 1%, 5% and 10% level respectively. All equations contain bank and time fixed effects. The estimation period is 1999 – 2014.

Explanatory variables	(1)	(2)	(3)	(4)
Main specification				
$\frac{Earnings_{i,t}}{Assets_{i,t-1}}$	0.334*** (15.60)	0.322*** (15.12)	0.339*** (15.67)	0.338*** (15.59)
$\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$	0.032*** (3.31)	0.047*** (5.43)	0.036*** (3.67)	0.036*** (3.65)
$\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}$	-0.005** (-2.90)	-0.004** (-2.53)	-0.005*** (-2.89)	-0.004*** (-2.73)
$\frac{Equity_{i,t}}{Assets_{i,t-1}}$	-0.013* (-1.76)	-0.014** (-1.99)	-0.012* (-1.68)	-0.012 (-1.63)
$ln(Assets_t)$	0.001 (1.26)	0.001* (1.86)	0.001 (1.62)	0.001* (2.074)
Time variation				
$D_t^{2010-2014} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$		0.002 (0.080)		
$D_t^{2010-2014} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$		-0.131*** (-6.60)		
Cross-sectional variation				
$D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$			-0.065** (-2.20)	-0.056* (-1.94)
$D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$			-0.071** (-2.42)	-0.060** (-2.00)
Cross-sectional and time variation				
$D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$				-0.074*** (-2.82)
$D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$				-0.144* (-1.73)
Diagnostics				
R^2-adj.	0.688	0.700	0.691	0.692
# of cross-sections	303	303	303	303
# of observations	2674	2674	2674	2674
Wald	72.07	74.36	66.41	61.27
Hausman test	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Yet, the coefficient of $D_t^{2010-2014} * \frac{\Delta Earnings_{i,t}}{Assets_{i,t-1}}$ is negative and significant at the 1% level. Moreover, the sum of this coefficient, -0.131, and of $\Delta Earnings_{i,t}/Assets_{i,t-1}$, 0.047, is negative: -0.084. Essentially, for the period after the shift, LLPs changed from signaling to more-forward looking: the higher the expected earnings, the lower the provisions. But, again, this effect is not economically significant as the elasticity at the mean, 0.084*0.0025 = 0.00021, is about 3.8% of the mean value of the dependent variable.

The model in column (3) indicates that, for the whole sample period, the USSIF banks exhibit less income-smoothing than the remaining ones. They also exhibit no signaling. Specifically, the terms $D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$ and $D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$ have negative coefficients, respectively -0.065 and -0.071, both significant at the 5% level. These coefficients imply less income-smoothing and less signaling. Moreover, since the overall coefficient of $\Delta Earnings_{i,t+1}/Assets_{i,t-1}$ is negative (0.036 – 0.071 =-0.035), there is no signalling; instead, forward-looking provisioning.

The results in column (3) are consistent with more prudent (and forward-looking) behaviour by the banks in which USSIF funds invest, as well as with stricter adherence to the incurred-loss model in the first part of the sample. However, the results in column (4) tilt the evidence towards more prudent and forward-looking behavior: Despite the greater leeway for earnings management after the shift towards more forward-looking LLPs, the banks under examination exhibited even less income-smoothing and more forward-looking behavior relative to the remaining banks.

In greater detail, the negative coefficients of the variables $D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$ and $D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$ indicate that for 'USSIF' banks income smoothing weakened further after the regulatory shift, while the forward-looking behaviour strengthened. Had the stricter application of the incurred-loss rules been the exclusive driver behind the weaker income smoothing documented in column (3), one could reasonably expect that the differential behavior of the banks under examination to be less pronounced after the shift in regulatory preferences – which implies a negative coefficient for $D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$. By the same logic, the coefficient of $D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$ would be positive. The coefficients of the other variables did not change materially from those in column (3).

Robustness checks.

The weaker income-smoothing after the shift in the regulatory preferences is an indication of

more forward-looking behavior of the USSIF banks. Even though they had comparatively more leeway for income smoothing, both from the shift –which applies to all sample banks— and from the relaxation of the constraints by the USSIF funds, apparently they chose to use it by less.

To examine whether this differential behavior is not driven by some unobservable characteristics of the banks in which USSIF funds invest, we repeated the analysis only for those banks which were in the portfolios of these funds for at least one period. The results, in table 4, are consistent with those in table 3. Focusing on columns (3) and (4), the coefficient estimates of the cross terms that capture the effects of time and cross-sectional variation are of similar size and have the same sign as those in table 3. The main difference is that the interaction terms of $\frac{Earnings_{i,t}}{Assets_{i,t-1}}$ in column (4), though negative, just miss the 10% significance level. Hence, the answer is no. Note also that from the remaining variables only the first is statistically significant.

In another robustness check, we estimated equation (1) cross-sectionally, using not the variables but the difference of their values in 2010 and 2007. In addition, we calculated the dummy variable

$$IN_{i,t}^{2007-2010} = \begin{cases} 1 \;\; if \text{ a USSIF fund had invested on bank's } i \text{ stock} \\ \qquad \text{every year from 2007 to 2010;} \\ 0 \text{ otherwise} \end{cases}$$

and included the terms

$$IN_{i,t}^{2007-2010} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$$

and

$$IN_{i,t}^{2007-2010} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$$

If the banks in which USSIF funds invest exhibit more prudent behavior, the coefficients of these terms should be negative: the shift towards more forward-looking LLPs, should affect these banks less than the remaining banks. To see it, consider the case where the smaller income smoothing of the said banks is driven exclusively by the stricter application of the incurred-loss model in 2007. In 2007, these banks operated under two constraints, regarding their LLPs: the regulatory constraint and the one imposed by the USSIF funds. The remaining banks operated under the regulatory constraint only. In 2010, with the regulatory shift towards more forward-looking LLPs, the USSIF banks experienced a bigger relaxation of the constraints. Hence, had the stricter application of the incurred-loss model in 2007 were behind the differential income

smoothing by USSIF banks, these banks should exhibit comparatively bigger change between 2007 and 2010.

Table 4. Robustness check – More homogeneous sample

This table reports the same regressions as table 3, the only difference being with the sample hanks. Here, the sample contains the banks that have been in the portfolios of USSIF banks at least for one year. As such, the sample is more homogeneous than that of table 3.

Explanatory variables	(1)	(2)	(3)	(4)
Main specification				
$\frac{Earnings_{i,t}}{Assets_{i,t-1}}$	0.281*** (5.73)	0.279*** (5.44)	0.303*** (5.58)	0.302*** (5.45)
$\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$	-0.004 (-0.29)	0.001 (0.085)	0.021 (1.42)	0.021 (1.39)
$\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}$	-0.004 (-1.22)	-0.003 (-1.02)	-0.004 (-1.25)	-0.003 (-1.00)
$\frac{Equity_{i,t}}{Assets_{i,t-1}}$	0.014 (1.27)	0.014 (1.28)	0.015 (1.31)	0.015 (1.30)
$ln(Assets_t)$	0.000 (0.23)	0.000 (0.50)	0.001 (0.72)	0.001 (1.06)
Time variation				
$D_t^{2010-2014} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$		-0.012 (-0.16)		
$D_t^{2010-2014} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$		-0.162** (-2.61)		
Cross-sectional variation				
$D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$			-0.057* (-1.73)	-0.051 (-1.60)
$D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$			-0.073** (-2.52)	-0.063** (-2.09)
Cross-sectional and time variation				
$D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$				-0.063 (-1.62)
$D_t^{2010-2014} * D_{i,t}^{USSIF} * \frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$				-0.157* (-1.86)
Diagnostics				
R^2-adj.	0.650	0.653	0.659	0.661
# of cross-sections	82	82	82	82
# of observations	778	778	778	778
Wald	18.85	22.56	19.01	22.26
Hausman test	Fixed effects	Fixed effects	Fixed effects	Fixed effects

The results of this cross-sectional estimation, in table 5, confirm this expectation. Furthermore, the descriptive statistics, in table 6, indicate that these banks changed their behavior by less than the other banks, which tilts the evidence further towards more prudent behavior.

Table 5. Robustness Check – Changes between 2007 and 2010

This table reports the results of the cross-sectional regression in which the dependent variable is $\frac{LLP_{i,t}}{Assets_{i,t-1}}\Big|_{t=2010} - \frac{LLP_{i,t}}{Assets_{i,t-1}}\Big|_{t=2007}$. The explanatory variables are also the difference of their values in 2010 and 2007. The dummy variable $IN_{i,t}^{2007-2010}$ identifies the banks that were in the portfolios of some USSIF fund(s) throughout the period 2007 – 2010.

Explanatory variables	(1)	(2)
All banks		
Change in $\frac{Earnings_{i,t}}{Assets_{i,t-1}}, 2010 - 2007$	0.372*** (8.14)	0.390*** (8.44)
Change in $\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}, 2010 - 2007$	-0.013 (-0.59)	-0.005 (-0.24)
Change in $\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}, 2010 - 2007$	-0.008* (-1.70)	-0.007 (-1.50)
Change in $\frac{Equity_{i,t}}{Assets_{i,t-1}}, 2010 - 2007$	0.039*** (2.69)	0.035** (2.31)
Change in $ln(Assets_t), 2010 - 2007$	-0.000 (-0.12)	-0.001 (-0.52)
Constant	0.006*** (6.90)	0.006*** (6.95)
Banks in the portfolios of USSIF funds every year from 2007 to 2010		
$IN_{i,t}^{2007-2010} *$ Change in $\frac{Earnings_{i,t}}{Assets_{i,t-1}}$		-0.629*** (-3.45)
$IN_{i,t}^{2007-2010} *$ Change in $\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$		-0.253 (-1.56)
Diagnostics		
R^2-adj.	0.557	0.576
# of cross-sections/observations	154	154
# of observations with $IN_{i,t}^{2007-2010} = 1$	33	33

We also tried to explore the differential response to the shift in regulatory preferences of banks that were in the portfolios of USSIF funds in 2007 but not in 2010. The small number of such banks, however, did not allow any meaningful estimation.

2.5 Concluding remarks

Our results indicate that stronger external monitoring by knowledgeable and influential stakeholders not only reduces earnings management by banks through LLPs but, more importantly, this is consistent with prudent forward-looking provisioning. From a policy point of view, the results suggest that the shift towards more forward-looking provisions, as advocated by supervisors and policy-makers, does not necessarily lead to more earnings management, as feared by the proponents of the incurred-loss approach to LLPs.

Market discipline seemingly can help strike a better balance between rules, like the incurred-loss model, and discretion, like the expected-loss model. Hence, the trade-off between transparency and financial stability may be less severe than commonly thought. Provided, of course, that market discipline works.

Looking for further evidence, we plan to extend this work to an international setting in which we will exploit the variation in the strength of market discipline both at the bank level and at the country level.

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Appendix

Table 6. Summary statistics (differences, 2010 – 2007)

This table reports summary statistics for the dependent and the explanatory variables of the regressions in table 5.

Variables	# of Obs.	Mean	Std. Dev	Min	Max
All banks with data throughout the period 2007 – 2010					
Loan-loss provisions (LLPs), scaled by lagged total assets	154	.0081	0.008	-0.015	0.040
Earnings before taxes and LLPs, scaled by lagged total assets	154	.0050	0.017	-0.032	0.075
One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	154	-0.010	0.029	-0.118	0.128
Change of total loans from the previous period, scaled by lagged total assets	154	-0.092	0.143	-0.803	0.267
Total equity to lagged total assets	154	-0.005	0.039	-0.133	0.153
Natural log of total assets	154	0.145	0.255	-0.366	1.078
Banks in the portfolio of USSIF funds throughout the period 2007 – 2010					
Loan-loss provisions (LLPs), scaled by lagged total assets	33	0.008	0.011	-0.005	0.058
Earnings before taxes and LLPs, scaled by lagged total assets	33	0.0008	0.016	-0.019	0.076
One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	33	-0.0007	0.007	-0.012	0.012
Change of total loans from the previous period, scaled by lagged total assets	33	-0.073	0.087	-0.367	0.180
Total equity to lagged total assets	33	0.003	0.022	-0.071	0.053
Natural log of total assets	33	0.118	0.236	-0.404	0.999

Table A1. Variable definitions and sources

Variable	Definition	Source
Bank – specific variables		
$\frac{LLP_{i,t}}{Assets_{i,t-1}}$	Loan-loss provisions (LLPs), scaled by lagged total assets	Federal Reserve Bank of Chicago
$\frac{Earnings_{i,t}}{Assets_{i,t-1}}$	Earnings before taxes and LLPs, scaled by lagged total assets	
$\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$	One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	
$\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}$	The change of total loans between t and $t-1$, scaled by lagged total assets	
$\frac{Equity_{i,t}}{Assets_{i,t-1}}$	Total equity to lagged total assets	
$\boldsymbol{ln(Assets_t)}$	Natural log of total assets	

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Chapter 3

Bank earnings management under civil society scrutiny
Evidence from an international setting

Abstract.

In this chapter, we explore whether the inclusion of a bank in the Dow Jones Sustainability Index (DJSI) reduces bank managers' incentives for earnings management through loan-loss provisions. The analysis rests upon two hypotheses: a) in a world plagued with asymmetric information, being included in the index conveys a strong signal to investors and thus is valuable for banks; b) prudent behavior, an aspect of which is less earnings management, is essential for inclusion in the index. The results from a sample of 297 banks around the globe, over the period 2004 – 2010, indicate that banks included in the DJSI engage in less earnings management relative to the banks that were assessed but not included. More interestingly, the weaker earnings management remains when we control for the strength of private sector monitoring, but largely diminishes when we control for the strength of supervisory power and capital regulation. This raises an interesting prospect that is worth pursuing more: that is, strong institutions may be a good substitute of market discipline. Since this discipline is related to ESG (Environmental, Social, Governance) factors, strong institutions may be a good substitute for civil society scrutiny.

3.1 Introduction

This chapter builds upon the previous one. The new item is the self-restraining behavior of bank managers for reputational reasons. Building upon Kayser, Maxwell and Toffel (2015), we hypothesize that being included in a reputable index conveys valuable information to investors. As a result, firms, and in our case banks, are willing to incur the costs, as well as to accept the restrictions on their activities, in order to be included in such an index and remain a member of.

The index under consideration is the Dow Jones Sustainability Index (DJSI), the pre-eminent sustainability index. Being a member of an index has several advantages. As summarized in Antzoulatos and Syrmos (2015), under the hypotheses of information cost (Merton, 1987), signaling (Jain 1987, Dhillon and Johnson 1991 and Denis et all, 2003) and liquidity (Beneish et al 2002, Hegde and McDermott 2003), index redefinitions do have informational value as they reduce the problem of asymmetric information between firms and investors. Therefore, the inclusion in the Index may have a positive effect, while the delisting a negative one (Chen et al., 2004).

Loan-loss provisions are related to the Index through the 'governance' component. More prudent LLPs are associated with less income smoothing.

There is, however, a data-related a constraint. The sample contains the banks included in the index and those who participated in the yearly evaluation process but were not. Both groups of banks incurred the costs and accepted the constraints. Our working hypothesis that differentiates them is that the banks already in the index try harder to remain, for the deletion might send negative signals.

The results, from the estimation of a typical income-smoothing equation (see the previous chapter of the thesis as well as Packer and Zhu [2012]), are quite interesting, yet they leave much to be further explored. Banks that are members of the DJSI engage in less earnings management via loan-loss provisions than the remaining ones. This more prudent provisioning behavior persists when we control for the strength of private sector monitoring with country-level indices for private monitoring and quality of external audits. Yet, it largely diminishes when we control for the strength of supervisory power and capital regulation.

To appreciate these results, the sample banks are among the biggest in the world and leaders in their respective countries. In addition, the bank fixed effects used in the estimation control for unobserved but time-invariant bank- and country-specific effects. Lastly, time fixed effects control for unobserved time-specific effects.

The results raise two important research questions. One pertains to the direction of causality; that is, whether in the DJSI are included banks, and firms more generally, from countries with stronger institutions. Given the objective difficulty of measuring ESG performance documented in the previous chapter of the thesis, a country's strong institutions

could be a criterion of inclusion in the Index. In such a case, one would have to think about what the Index measures.

The second question has wider implications. Are strong institutions a good substitute for market discipline? Since this discipline is related to ESG (Environmental, Social, Governance) factors, are strong institutions a good substitute for civil society scrutiny? The widely-held belief is that institutions and market forces, institutional discipline and market discipline, are complements.

The remainder of the chapter is organized as follows. Section 2 sketches the logical foundations. Section 3 discusses the estimation to be estimated and the data, while section 4 presents the results. Section 5 concludes with directions for further research along the lines outlined above.

3.2 Logical foundations

A growing number of bank stakeholders (shareholders, managers, employees, creditors, governments, civic society organizations) are seeking information about how effectively banks manage their risks. Although prudent banks attempt in various ways to convey their behavior to stakeholders, information asymmetry renders this signaling action ineffective. Banks that don't operate in a prudent and sustainable manner can mimic prudent banks' behavior in sending such a signal, when there are no signaling costs and when a rigorous evaluation process is not in place. For a signal to be credible, it should satisfy both of the aforementioned conditions.

Pertaining to stakeholders' information seeking, most major stock indexes, in collaboration with leading experts in the assessment of sustainability, created specialized indexes that list companies according to their relative socially responsible performance. These indexes can satisfy the two credible signal conditions mentioned above, as they incorporate thorough evaluation processes and non negligible costs to the assessed banks.

Also, the inclusion in these indexes may help banks build their reputation, with beneficial effects on both sides of their balance sheets and on their income statements. Sustainability may help banks attract more deposits, which is the most recognized source of funding. It may also help attract and retain more high-quality creditors, who would appreciate the benefits from the banks' reputation. Moreover, sustainable banks may attract and retain high-quality employees, while the increased scrutiny by external stakeholders they subject themselves to may help them in making better business decisions.

In this paper, we examine whether banks included in the Dow Jones Sustainability Index (DJSI) operate in a prudent and sustainable manner and whether this behavior is conveyed to

investors through conservative earnings management by bank managers. While it is essential for a bank to operate on a prudent manner, it is equally important to convey to investors whether this prudent behavior has actually been implemented. Here, prudent behavior is associated with less earnings management by bank managers. This implies that loan-loss provisions are less related to current income levels. The implementation of a prudent behavior is being proven for a bank through the inclusion and the maintenance of its listed status in the DJSI.

All banks in our sample where assessed for inclusion in the Index, and a subsample of them was included in the Dow Jones Sustainability Index (DJSI). The assessed banks subject themselves to increased scrutiny, during the yearly evaluation process and the on-going monitoring afterwards. They also incur substantial costs in order to distinguish themselves for their sustainability performance and get included in the Index. The assessment process combines qualitative and quantitative information, both publicly available and private.

In essence, we argue that the inclusion in the DJSI Index functions as a signal because such extensive and rigorous assessment can result to reputational benefits for each of the included banks. Also, for each bank that is being included in the Index, thus being constantly monitored every year, the signaling action appears to outweigh the costs of assessment.

We hypothesize that inclusion in the Dow Jones Sustainability Index will force a bank to operate in a prudent and sustainable manner in order to maintain its listed status. Therefore for the included banks we expect reduced bank managers' incentives for earnings management through loan-loss provisions.

3.3 Econometric issues

Equation.

As in the previous chapter, we estimate the equation

$$\frac{LLP_{i,j,t}}{Assets_{i,j,t-1}} = \alpha \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} + \beta \frac{\Delta Earnings_{i,j,t+1}}{Assets_{i,j,t-1}} + \gamma \frac{\Delta Loans_{i,j,t}}{Assets_{i,j,t-1}} + \delta \frac{Equity_{i,j,t}}{Assets_{i,j,t-1}} + \varepsilon ln\left(Assets_{i,j,t}\right) + b_i + z_t + u_{i,t} \quad (1)$$

where i, j and t respectively denote banks, countries and time; $LLP_{i,j,t}$ stands for loan-loss provisions, $Assets_{i,j,t-1}$ for total assets, $Earnings_{i,j,t}$ for net income before taxes and provisions, $\Delta Earnings_{i,j,t+1}$ for the one-period ahead change in earnings, $\Delta Loans_{ij,t}$ for the

change in loans from the previous period, and $Equity_{i,j,t}$ for bank's book equity; $ln(Assets_{i,j,t})$, the logarithm of total assets, is a proxy of size, while b_i and z_t denote bank and time fixed-effects.

A positive α would indicate income smoothing, a positive β signalling, but a negative one forward-looking provisioning, a negative γ procyclical loan-loss provisioning, while a negative δ would indicate loan-loss provisioning driven by capital concerns. More details will be provided in the discussion of the results, as need arises. To evaluate the economic significance of each explanatory variable, we calculate its elasticity at the mean; that is, its estimated coefficient multiplied with its mean value and divided by the mean value of the dependent variable.

To test for the significance of inclusion in the DJSI, we calculate a dummy variable that identifies the bank-years at which a bank has been included in the Index

$$D_{i,j,t}^{DJSI} = \begin{cases} 1 \ \ if \text{ a bank has been included in the DJSI index in year } t; \\ 0 \text{ otherwise} \end{cases}$$

and include in the equation the term

$$D_{i,j,t}^{DJSI} * \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$$

A negative coefficient will indicate less earnings management by the banks included in the DJSI index relative to the banks that were invited to participate in the assessment. And vice-versa.

Determinants of earnings management across countries.

This subsection analyzes potential country-level determinants of bank earnings management with loan-loss provisions. Differences in bank regulation (capital stringency and restrictions on banking activities), official supervision, private monitoring, and external auditing, are all taken into account. The rationale, the proxies and the expected sign of these potential determinants are discussed below.

The characteristics of bank regulation in each country are incorporated into the analysis with two measures, one that refers to the restrictions on banking activities and one that refers to capital stringency. We use the measure of regulatory restrictions (RESTRICT), available in the World Bank Regulation and Supervision Database. This variable indicates whether bank activities in securities, insurance and real estate markets are unrestricted, permitted, restricted,

or prohibited. This indicator ranges from 4 to 12, with higher values indicating more restrictions on bank activities. We expect a negative effect for RESTRICT, as tighter regulations reduce bank competition and incentives for risk-taking, thus leading to lower income smoothing.

For capital stringency, we use the capital regulatory index (CAPREG) which measures whether capital requirement reflects certain risk elements, and deducts certain market value losses from capital before minimum capital adequacy is determined. This indicator ranges from 0 to 10, with higher values indicating greater stringency on bank capital. A positive coefficient would indicate that the higher the stringency, the bigger the incentives for earnings management. Yet, a negative coefficient would indicate lower leeway.

The influence of supervision is incorporated into the analysis, using the World Bank Regulation and Supervision Database variables to measure both official supervision and the extent of private monitoring. Official supervisory power (SUPPOWER) in each country is defined as the authority the supervisory authorities have in order to take specific actions to prevent and correct problems. This variable ranges from 0 to 14, with a higher value indicating more power of supervisors. We predict a negative effect of SUPPOWER. A negative coefficient will indicate that greater supervisory power will discipline bank managers and reduce their incentives and leeway to smooth out earnings.

The private monitoring index (PRIVMON) included in the analysis measures whether there are incentives and the ability for the private monitoring of firms. This variable ranges from 0 to 12, with higher values indicating greater private monitoring. We predict a negative effect of PRIVMON, as increased monitoring reduces bank managers' leeway for income smoothing.

Lastly, we measure the quality and effectiveness of external audits (EXTAUDIT) by using the appropriate index from the World Bank Regulation and Supervision Database. This variable ranges from 0 to 7, with a higher value indicating better strength of the external auditing system. We predict a negative effect of EXTAUDIT. A negative coefficient will indicate that better control and monitoring by external audits can reduce opportunistic earnings management behavior.

To test the influence of country indices on bank earnings management we incorporate an interaction term for each country index and the earnings variable into equation (1). Following Barth et al. (2004) and Fonseca and González (2008), we incorporate each interaction term separately into equation (1), in order to explore solely the effect of each index on income smoothing,

From these indices, $CAPREG$ and $SUPPOWER$ measure the strength of supervisory discipline. The higher their values, the stronger the discipline. $PRIVMON$ and $EXTAUDIT$ measure the strength of private monitoring. The higher their values, the stronger the private monitoring and, presumably, the stronger the market discipline.

Thus, the equation to be estimated is augmented to the following:

$$\frac{LLP_{i,j,t}}{Assets_{i,j,t-1}} = \alpha \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} + \beta \frac{\Delta Earnings_{i,j,t+1}}{Assets_{i,j,t-1}} + \gamma \frac{\Delta Loans_{i,j,t}}{Assets_{i,j,t-1}} + \delta \frac{Equity_{i,j,t}}{Assets_{i,j,t-1}}$$

$$+ \varepsilon ln\left(Assets_{i,j,t}\right) + b_i + z_t + \zeta D_{i,j,t}^{DJSI} \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} + \eta I_{j,t} \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} + u_{i,t} \quad (2)$$

where $I_{j,t}$ stands for the aforementioned country-level indices, while ζ and η are coefficients to be estimated. A negative ζ would indicate that the inclusion in the DJSI is associated with less earnings management. Likewise a negative η.

Our focus is on the term $\alpha + \zeta D_{i,j,t}^{DJSI} + \eta I_{j,t}$, which measures the overall extent of earnings management.

Data.

The DJSI is one of the oldest and most reputable sustainability index. Introduced in 1999, it consists of firms that achieved the highest scores of their sectors in terms of sustainability (best-in-class approach). The assessment is being conducted annually by Sustainability Asset Management (SAM). Each year, the largest 2,500 companies listed in the Dow Jones World Index (DJGI) are invited to voluntary participate in the assessment, and the top 10% companies from every sector in terms of sustainability are included in the DJSI. From these, depending on the year, approximately 1,000 – 1,400 companies are assessed and about 320 are included in the DJSI. As a result of the assessment, every year new companies are listed, companies that scored relatively lower are delisted, and companies with the highest scores in their sectors are characterized as super sector leaders.

The assessment process is based on an on-line questionnaire that covers all aspects of sustainability, i.e, economic, environmental and social. In addition, it is has a typical best-in class approach: the companies that score in the top 10% in corporate sustainability in each of the 59 DJGI industry groups are selected, with only limitation that 15-20% of each industry's market capitalization is covered. As such, this process involves non-negligible costs to the assessed firms, which go well beyond the costs of completing the required questionnaires and the sharing of confidential information. For one thing, the assessed firms must continually intensify their sustainability initiatives in order to be included or to remain in the DJSI. In addition, those included, are monitored on a continuous basis by SAM until the next assessment period.

We use a unique, hand-collected dataset of DJSI index members. The primary data comes from SAM's annual announcements of index member-changes and is cross-checked, on a case-by-case basis, with other two sources, namely the Bloomberg announcement stream and sustainableindexes.org.

The sample period is 2004 – 2010. It covers the period for which the yearly changes in the DJSI were publicly announced before taking place. After 2010, the composition was not publicly announced, weakening the effect on individual participants from the amelioration of asymmetric information problems associated with inclusion in the Index.

The data for banks invited to participate in the assessment were collected from Thomson Reuters Eikon. We examine 296 banks from 50 countries, with 1,302 yearly observations. From the sample banks, 34 have been included in the Dow Jones Sustainability index at least once, about 11.4% of the total, while the relevant bank-year observations are 156 about 11.9% of all observations. These bank-years observations are identified by the $D_{i,t}^{DJSI}$ dummy.

The indices related to bank regulation (capital stringency and restrictions on banking activities), official supervision, private monitoring and external auditing were collected from the World Bank Regulation and Supervision Database.

As table 1 indicates, banks that are included in the DJSI index tend to have lower LLPs, higher one year ahead earnings before taxes and provisions, bigger change in loans and more assets.

Table 1. Summary statistics

The table reports descriptive statistics for the variables employed in the analysis. The sample period is 2004 – 2010 for all invited banks for assessment by the Sustainability Asset Management (SAM). DJSI stands for Dow Jones Sustainability Index.

Variables	# of Obs.	Mean	Std. Dev	Min	Max
All bank-years					
Loan-loss provisions (LLPs), scaled by lagged total assets	1302	0.0056	0.0092	-0.0054	0.1181
Earnings before taxes and LLPs, scaled by lagged total assets	1302	0.0155	0.0174	-0.0207	0.2830
One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	1302	0.0012	0.0088	-0.0461	0.1315
The change of total loans between *t* and *t* – 1, scaled by lagged total assets	1302	0.0780	0.1308	-0.5746	1.2289
Total equity to lagged total assets	1302	0.2075	0.1461	0.0369	1.4808
Natural log of total assets	1302	18.29	1.49	13.58	21.64

Bank-years for which a bank has been included in the DJSI					
Loan- loss provisions (LLPs), scaled by lagged total assets	156	0.0053	0.0090	0.0001	0.0755
Earnings before taxes and LLPs, scaled by lagged total assets	156	0.0146	0.0212	-0.0030	0.2221
One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	156	0.0020	0.0085	-0.0191	0.0605
The change of total loans between *t* and *t* – 1, scaled by lagged total assets	156	0.0919	0.1531	-0.1948	1.0456
Total equity to lagged total assets	156	0.2150	0.1218	0.0497	0.8066
Natural log of total assets	156	20.20	1.19	13.94	21.64

Lastly, table 2, which exhibits the cross-correlation table, indicates that multicollinearity is not a problem.

Table 2. Cross-correlation matrix

The table reports the correlation matrix of the dependent and the control variables for the period 2004 – 2010. $LLP_{i,j,t}$ stands for loan-loss provisions, $Assets_{i,j,t-1}$ for total assets, $Earnings_{i,j,t}$ for net income before taxes and provisions, $\Delta Earnings_{i,j,t+1}$ for the one-period ahead change in earnings, $\Delta Loans_{i,j,t}$ for the change in loans from the previous period, and $Equity_{i,j,t}$ for bank's book equity; $ln(Assets_{i,j,t})$ is the logarithm of total assets.

	$\frac{LLP_{i,t}}{Assets_{i,t-1}}$	$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$	$\frac{\Delta Earnings_{i,j,t+1}}{Assets_{i,j,t-1}}$	$\frac{\Delta Loans_{i,j,t}}{Assets_{i,j,t-1}}$	$\frac{Equity_{i,j,t}}{Assets_{i,j,t-1}}$	$ln(Assets_{i,j,t})$
$\frac{LLP_{i,j,t}}{Assets_{i,j,t-1}}$	1.000					
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$	0.756	1.000				
$\frac{\Delta Earnings_{i,j,t+1}}{Assets_{i,j,t-1}}$	0.341	0.320	1.000			
$\frac{\Delta Loans_{i,j,t}}{Assets_{i,j,t-1}}$	0.129	0.249	0.179	1.000		
$\frac{Equity_{i,j,t}}{Assets_{i,j,t-1}}$	0.369	0.464	0.167	0.374	1.000	
$ln(Assets_{i,j,t})$	-0.114	-0.273	-0.065	0.057	-0.083	1.000

3.4 Empirical results

The results are largely consistent with expectations. Briefly, the banks included in the Dow Jones Sustainability Index exhibit lower earnings management as compared with the banks that participated in the assessment but didn't get included. More interestingly, the weaker earnings management remains when the proxies of the strength of private sector monitoring are included in the equation, but largely diminishes when the proxies of the strength of supervisory power and capital regulation are included.

Main results.

Table 3 summarizes the main results. The first model corresponds to equation (1), while the remaining six to the extensions that aim to explore the effect on earnings management of the stronger external monitoring on banks included in the DJSI. All estimated equations include time and bank fixed effects, while the robust standards errors are clustered at the bank level. The estimated coefficients reveal that there is earnings management for the whole sample. Also, there is no evidence of signaling, countercyclical behavior and management of capital ratios.

Starting with the typical model in column (1), the positive coefficient of $Earnings_{i,j,t}/Assets_{i,j,t-1}$ 0.219 with a *t*-statistic 4.57, indicates that there is earnings management for the whole sample. Its elasticity at the mean, 0.219*0.0155/0.0056 = 0.58, suggests that this variable is economically significant as well.

The non statistically significant coefficient of $\Delta Earnings_{i,j,t+1}/Assets_{i,j,t-1}$, is consistent with no signaling. Similarly, the coefficients for $\Delta Loans_{i,j,t}/Assets_{i,j,t-1}$ and $Equity_{i,j,t}/Assets_{i,j,t-1}$ are not statistically significant.

The model in column (2) shows that there is also evidence for earnings management for the whole sample, as the coefficient of $Earnings_{i,j,t}/Assets_{i,j,t-1}$ is positive and significant. Also, this variable is economically significant as its elasticity at the mean is 0.235*0.0155/0.0056 = 0.65. The coefficients of the variables in the base model above are essentially the same.

However, the additional term $D_{i,j,t}^{DJSI} * \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$ has a negative and significant coefficient, indicating that the banks included in the Index exhibit less earnings management than the remaining ones. The extend of earnings management for the banks included in the Index is measured by $\alpha + \zeta D_{i,j,t}^{DJSI} \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} = 0.235 - 0.069$, which is negative. The elasticity at the mean is 0.166*0.0155/0.0056 = 0.46.

Overall, the results in column (2) are consistent with our working hypothesis for more

Table 3. Main results

In each regression, the dependent variable is loan-loss provisions (LLPs) scaled by lagged total assets. The dummy variable $D_{i,j,t}^{DJSI}$ takes the value one if bank *i* has been included in the DJSI index at year *t*. Standard errors are heteroskedasticity-robust and clustered at the bank level. *t*-statistics are reported in parentheses. Three, two and one asterisks, ***, ** and *, denote statistical significance at the 1%, 5% and 10% level respectively. All equations contain bank and time fixed effects. The estimation period is 2004 – 2010.

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Main specification							
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$	0.219*** (4.57)	0.235*** (5.01)	0.234*** (2.38)	0.463*** (6.10)	-0.159 (-0.61)	0.276*** (3.31)	-0.035 (-0.13)
$\frac{\Delta Earnings_{i,j,t+1}}{Assets_{i,j,t-1}}$	0.041 (1.47)	0.047 (1.55)	0.031 (0.93)	0.025 (0.84)	0.039 (1.13)	0.044 (1.50)	0.037 (1.04)
$\frac{\Delta Loans_{i,j,t}}{Assets_{i,j,t-1}}$	-0.002 (-0.56)	-0.002 (-0.49)	-0.000 (-0.12)	-0.001 (-0.35)	-0.003* (-1.72)	-0.003* (-1.81)	-0.000 (-0.11)
$\frac{Equity_{i,j,t}}{Assets_{i,j,t-1}}$	0.008 (1.39)	0.006 (1.44)	0.006 (1.54)	0.002 (0.58)	0.008** (2.09)	0.007** (2.57)	0.006 (1.11)
$ln(Assets_{i,j,t})$	0.002 (1.33)	0.002 (1.27)	0.001 (0.58)	0.000 (0.10)	-0.001 (-0.54)	-0.001 (-0.77)	0.001 (0.53)
Cross-sectional (bank) variation							
$D_{i,j,t}^{DJSI} * \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$		-0.069** (-2.31)	-0.064** (-2.40)	-0.031 (-1.13)	-0.061* (-1.72)	-0.045 (-1.57)	-0.081*** (-3.17)
Cross-sectional (country) variation							
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} * RESTRICT$			-0.001 (-0.12)				
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} * SUPPOWER$				-0.018*** (-6.28)			
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} * PRIVMON$					0.035 (1.27)		
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} * CAPREG$						-0.012** (-2.07)	
$\frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}} * EXTAUDIT$							0.038 (0.93)
Diagnostics							
R^2-adj.	0.254	0.262	0.301	0.323	0.366	0.367	0.310
# of cross-sections	296	296	289	292	280	288	292
# of observations	1302	1302	1194	1197	1149	1171	1213
Wald	16.62	15.99	15.16	16.32	15.07	13.18	16.67
Hausman test	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects

prudent behavior by the banks included in the DJSI in order to maintain their listed status, which conveys a strong signal to investors

Controlling for the strength of supervisory and market discipline.

The results in the remaining specifications indicate that the weaker earnings management of banks in the DJSI remains when the proxies of the strength of private sector monitoring are included in the equation, but largely diminishes when the proxies of the strength of supervisory power and capital regulation are included. Specifically, the coefficients of supervisory power and capital regulations are negative and render the coefficient of $D_{i,j,t}^{DJSI}$ insignificant – marginally in the second specification, while the coefficients of private monitoring and quality of external audits, as well as of restrictions on bank activities, are insignificant.

In greater detail, Column (3) shows that the coefficient of $Earnings_{i,j,t}/Assets_{i,j,t-1}$ remains positive and significant, thus supporting the hypothesis for income smoothing. Furthermore, in this specification the $D_{i,j,t}^{DJSI} * \frac{Earnings_{i,j,t}}{Assets_{i,j,t-1}}$ coefficient is also negative and significant, an indication of less earnings management by the banks included in the DJSI. The coefficient of $\frac{Earnings_{i,t}}{Assets_{i,t-1}} * RESTRICT$,which controls for the restrictions on banks, is insignificant.

Moreover, in column (4) the coefficient of $Earnings_{i,t}/Assets_{i,t-1}$ is positive and significant, but $D_{i,t}^{DSJI} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$ has a negative and insignificant coefficient. This is due to the inclusion in this model of the supervisory power index $\frac{Earnings_{i,t}}{Assets_{i,t-1}} * SUPPOWER$, which is negative and significant. Supervisory power appears to diminish the weaker earnings management of the banks included in the DJSI.

Column (5) shows that the coefficient of $Earnings_{i,t}/Assets_{i,t-1}$ is insignificant. The coefficient of $D_{i,t}^{DSJI} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$ is negative and significant in this model, while the included index for private monitoring $\frac{Earnings_{i,t}}{Assets_{i,t-1}} * PRIVMON$ is insignificant.

However, the results in column (6) indicate a positive and significant coefficient of $Earnings_{i,t}/Assets_{i,t-1}$ and a negative but insignificant coefficient of $D_{i,t}^{DSJI} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$. Inclusion in this model of the regulatory capital index $\frac{Earnings_{i,t}}{Assets_{i,t-1}} * CAPREG$, which is negative and significant, assumingly diminishes the weaker earnings management of the banks included in the DJSI.

Lastly, in column (7), the coefficient of $Earnings_{i,t}/Assets_{i,t-1}$ is insignificant and the

coefficient of $D_{i,t}^{DSJI} * \frac{Earnings_{i,t}}{Assets_{i,t-1}}$ is negative and significant, while controlling for the quality of external audits $\frac{Earnings_{i,t}}{Assets_{i,t-1}} * EXTAUDIT$, which is insignificant.

3.5 Concluding comments

Our results raise several interesting research questions. Two were discussed in the introduction. Another one concerns the differential behavior of country-level indices regarding regulatory and private discipline on banks. Is the significance of the former indices due to the fact that they pertain to banks, and the insignificance of the latter due to the fact that they pertain to the whole economy;

In any event, we plan to extend this work in three directions along these questions. Specifically, we plan to essentially reverse-engineer the DJSI to check answer the causality question: does the inclusion in the Index induce more prudent loan-loans provisioning behavior or the stronger regulatory discipline is behind both this behavior and the inclusion in the Index? Next, we plan to further explore whether strong institutions are a good substitute for market discipline and civil society scrutiny. For the last question, we plan to include indices that measure the strength of private monitoring, and hence of market discipline, at the bank level.

Other possible extensions is to enlarge the sample with all listed banks in the countries whose banks participate in the annual DJSI-construction process, as well as to extend the sample period beyond 2010.

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Appendix

Table A1. Variable definitions and sources

Variable	Definition	Source
Bank – specific variables		
$\frac{LLP_{i,t}}{Assets_{i,t-1}}$	Loan-loss provisions (LLPs), scaled by lagged total assets	Thomson Reuters Eikon
$\frac{Earnings_{i,t}}{Assets_{i,t-1}}$	Earnings before taxes and LLPs, scaled by lagged total assets	
$\frac{\Delta Earnings_{i,t+1}}{Assets_{i,t-1}}$	One year ahead change of earnings before taxes and provisions, scaled by lagged total assets	
$\frac{\Delta Loans_{i,t}}{Assets_{i,t-1}}$	The change of total loans between t and $t-1$, scaled by lagged total assets	
$\frac{Equity_{i,t}}{Assets_{i,t-1}}$	Total equity to lagged total assets	
$ln(Assets_t)$	Natural log of total assets	
Country – specific variables		
RESTRICT	Index that measures whether bank activities in securities, insurance and real estate markets are unrestricted, permitted, restricted, or prohibited. Values range from 4 to 12, with higher values indicating more restrictions on bank activities	World Bank Regulation and Supervision Database
SUPPOWER	Index that measures the strength the supervisory authorities have in order to take specific actions to prevent and correct problems. Values range from 0 to 14, with a higher value indicating more power of supervisors	
PRIVMON	Index that measures whether there are incentives and the ability for the private monitoring of banks. Values range from 0 to 12, with higher values indicating greater private monitoring	
CAPREG	Index that measures the overall capital stringency. Values range from 0 to 10, with higher values indicating greater stringency on bank capital	
EXTAUDIT	Index that measures the quality and effectiveness of external audits. Values range from 0 to 7, with a higher value indicating better strength of the external auditing system	