

Accounting Discretion, Loan Loss Provisioning, and Discipline of Banks' Risk-Taking

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Abstract

Policy makers argue that loan loss accounting should allow bank managers' more discretion to incorporate forward-looking judgments into loan loss provisions. This paper explores potential consequences of such increased discretion for the role of accounting information in supporting outside discipline of bank risk-taking. Using a large sample of banks from 27 countries, we isolate three distinct aspects of discretionary loan provisioning practices within each country that reflect forward-looking orientation. We investigate the extent to which each aspect is associated with stronger or weaker discipline of bank risk-taking behavior. We model risk-taking discipline using two measures: (1) the sensitivity of changes in bank capital to changes in bank risk; and (2) the observed risk-shifting behavior of banks. We document that discretionary provisioning in the form of earnings smoothing dampens disciplinary pressure on risk-taking, consistent with smoothing reducing bank transparency and inhibiting monitoring by outsiders. In contrast, aspects capturing the extent to which provisions explicitly anticipate future changes in non-performing loans and future loan growth are associated with enhanced discipline of bank risk-taking. A main message of the paper is that discretion over bank loan loss provisioning can have beneficial or negative real consequences for discipline of bank risk-taking, depending on how managers exploit available discretion to shape loan loss provisions.

Keywords: Smoothing, Loan Loss Provisions, Discretion, Risk, Banks

JEL Classifications: E58, G21, G32, M41

1. Introduction

Accounting information inherently trades off information needs across heterogeneous user demands to support a wide range of decision contexts and contractual arrangements (e.g., Ball 2001 and Holthausen and Watts 2001). Given such tradeoffs, changing accounting standards to enhance one particular role could degrade the usefulness of accounting information for other uses (e.g., Gjesdal 1981). Recent high profile proposals by the Financial Stability Forum (2009) and U.S. Treasury (2009) accentuate a standing debate between policy makers and accounting standard setters over loan loss accounting for banks, calling for standards setters to re-evaluate and potentially replace the incurred loss model underlying current loan loss provisioning requirements.¹ In this paper, we contribute to this debate, and more generally to the earnings quality literature, by exploiting cross-country variation in loan loss provisioning to isolate key properties of loan loss provisions that allow us to explore potential tradeoffs inherent in fundamentally changing loan loss accounting.

Loan loss provisioning is a key accounting choice that directly influences the volatility and cyclical nature of bank earnings, as well as information properties of banks' financial reports with respect to reflecting risk attributes of loan portfolios.² Regulators and policy makers have argued that current loan loss provisioning rules reinforce pro-cyclical effects of capital regulation due to the *ex post* nature of the recognition of credit losses under such rules. They further argue that loan loss accounting should adopt a more forward-looking (or *ex ante*) orientation relative to

¹ Current accounting under U.S. GAAP and IFRS utilize an incurred loss model where a provision for loan losses is recognized only after loss impairment events have occurred prior to the financial reporting date that are likely to result in non-payment of loans in the future. This accounting limits consideration of expected effects of future events.

² Prior research documents a positive relation between discretionary loan loss provisions and bank stock return and future earnings. See for example Beaver et al. (1989), Wahlen (1994), Liu and Ryan (1995), Liu et al. (1997) and Kanagaretnam et al. (2004).

the incurred loss model to dampen such pro-cyclicality.³ While the precise form that such forward-looking provisioning should take remains an open question, proposals to increase forward-lookingness would generally incorporate a broader range of information and create an expanded role for managerial discretion in the assessment of future expected losses. As an example, Turner (2010) suggests that there should be two separate line items reported for loan loss provisions: the existing line, based on incurred credit impairment events as done currently, and a separate line that reflects expected losses calculated by reference to judgments about future possible losses informed by past experience or by formulae which link provisions to broad indicators of likely future credit problems (such as the pace of credit growth on which the Spanish dynamic provisioning approach is based).⁴

However, accounting discretion is a double-edged sword (e.g., Dechow and Skinner 2000). While increased discretion may facilitate incorporation of more forward looking information about future expected losses into loan provisioning decisions and mitigate pro-cyclicality, it also increases potential for opportunistic accounting behavior by managers which may degrade the transparency of banks and lead to negative consequences along other dimensions. The objective of this paper is to explore consequences of discretion in loan loss provisioning for the role of accounting transparency in supporting outside discipline of bank risk-taking.

³ Financial Stability Forum (2009) defines pro-cyclicality as the dynamic interaction between the financial and the real sectors of the economy that amplify business cycle fluctuations and cause or exacerbate financial instability. The idea is that when loan loss reserves cannot absorb recessionary credit losses, greater loan loss recognition reduces capital adequacy, potentially causing banks to reduce lending and exacerbate the downturn.

⁴ Fernández de Lis et al. (2001) and Pérez et al. (2008) examine Spain's dynamic provisioning regime. Discussions of alternative loan loss accounting models include Borio et al. (2001), Laeven and Majnoni (2003), and Benston and Wall (2005)). See IASB (2009) for a recent proposal to change loan loss accounting. Barth (2006) carefully explicates a standard setting perspective on incorporating estimates of the future in financial statements. The extent to which any of the proposed alternatives would actually mitigate pro-cyclicality is still largely an open question. See Beatty and Liao (2011) for recent evidence in this regard.

It has long been recognized that financial accounting information plays a fundamental role in corporate governance, supporting the monitoring of managers by boards of directors, outside investors and regulators, and the exercise of investor rights granted by existing laws (e.g., Bushman and Smith 2001). Related to this idea, the banking literature posits that informational transparency of banks can play a fundamental role in promoting market discipline by outside investors as a fundamental lever of prudential bank regulation.⁵ Financial accounting information, by providing credible and relevant bank-specific information about the financial performance and condition of banks, represents a fundamental component of bank transparency. Increasing discretion in order to infuse loan loss provisioning with more forward-looking judgment could have unintended consequences, one of which may be a reduction in the transparency of banks with respect to loan portfolio risk. In this paper, we empirically isolate several distinct manifestations of discretionary, forward-looking provisioning, and document that some manifestations degrade the disciplining role of accounting while others enhance it.

While we would ideally like to directly compare the incurred loss model with specific alternative models, this is not possible given that such alternatives have not been implemented. Instead, we use a large sample of banks from 27 countries to exploit cross-country variation in allowable discretion in loan provisioning behavior. Discretionary aspects of loan provisioning are estimated relative to a set of fundamental determinants of loan loss provisions that roughly correspond to an incurred loss model. We estimate three distinct aspects of loan provisioning practices that can be construed as reflecting a forward-looking orientation. Utilizing these country-level measures, we empirically investigate the extent to which each aspect is associated

⁵ Market discipline seeks to harness market forces in the service of bank regulation and is embedded in the Basel II Capital Accord. Specifically, the Basel II Capital Accord is based around three complementary pillars. Pillar 3 recognizes that market discipline has the potential to reinforce minimum capital standards (Pillar 1) and the supervisory review process (Pillar 2), and so promote safety and soundness in banks and financial systems.

with stronger or weaker discipline of bank risk-taking behavior. We capture the extent of discipline using two measures. First, we study the relation between the measures of discretion and the sensitivity of changes in bank capital to changes in the risk of a bank's assets. Secondly, we examine the relation between discretion and the observed risk-shifting behavior of banks.⁶

Our first measure of discretionary provisioning behavior is smoothing, defined as the coefficient from a regression of loan loss provisions on contemporaneous earnings and controls.⁷ Higher sensitivity of current provisions to current period earnings realizations is interpreted as a higher level of discretionary smoothing. The banking literature has posited that smoothing is *implicitly* forward-looking in nature and can mitigate pro-cyclicality. The idea is that smoothing allows managers to build up reserves in periods when earnings are high and current losses are low, and to then draw them down in future periods when earnings are low and current loan losses are high (e.g., Borio et al. 2001, Laeven and Majnoni 2003, and Bikker and Metzmakers 2004).⁸ Providing banks more discretion to smooth provisions could allow opportunistic earnings management that obscures fundamentals, or it could enhance earnings informativeness. We indirectly distinguish these possibilities by investigating the implications of smoothing for the discipline of bank risk-taking.

Our next two measures use future outcome variables to isolate the extent to which explicit forward-looking information is reflected in current loan provisioning. First, we use the coefficient from regressing current period loan loss provisions on next year's change in non-

⁶ Risk shifting refers to the phenomenon where banks' equity holders benefit at the expense of deposit insurers and others by increasing the risk of asset portfolios without adequately increasing bank capital simultaneously.

⁷ We control for a set of non-discretionary determinants of loan losses, and then extract measures of discretionary smoothing and forward-lookingness that are orthogonal to the non-discretionary fundamentals. This approach allows for the possibility that the incurred loss model could differ across countries in the extent to which discretion is permitted. Beatty and Liao (2011) and Dugan (2009) discuss the role of judgment in the incurred loss model.

⁸ The claim that smoothing mitigates pro-cyclicality has not been empirically established.

performing loans. This measure captures the extent to which current provisions anticipate future deteriorations in the loan portfolio. The second measure is the coefficient from regressing current period loan loss provisions on next year's loan growth. This measure is motivated by Foos et al. (2010) who provide evidence that loan growth is positively related to the riskiness of banks' loan portfolios. This measure captures the extent to which current provisions anticipate the trajectory of loan growth and the higher expected loan losses associated with such growth.

Turning to risk taking behavior, we first estimate the impact of our three aspects of provisioning on the relation between changes in the volatility of bank assets and changes in bank leverage. This analysis posits that outside discipline manifests via pressure on banks to decrease leverage (i.e., increase capital) in response to increases in risk, and that more intense outside discipline is associated with a higher sensitivity of changes in leverage to changes in risk. We document that, indicative of smoothing dampening disciplinary pressure, the sensitivity of changes in bank leverage to changes in asset volatility is lower in high smoothing regimes relative to low smoothing regimes. In contrast, our explicit measures of forward-lookingness are associated with a higher sensitivity of changes in bank leverage to changes in asset volatility.

We next investigate relations between our three aspects of provisioning and bank risk-shifting. Explicit and implicit deposit guarantees create incentives for banks to shift risk onto the deposit guarantee agency by increasing the risk of assets without simultaneously increasing capital adequately. Countering such incentives, deposit insurers and uninsured creditors have incentives to monitor and discipline bank risk taking behavior. We examine the relative strength of these competing forces as a function of loan provisioning characteristics using Merton's (1977) characterization of the deposit insurance put option. We provide evidence that banks in

high smoothing regimes exhibit more risk-shifting relative to banks in low smoothing countries, while the opposite result holds with respect to our explicit forward-looking metrics.

Our paper makes a fundamental contribution to the earnings quality literature. Dechow et al. (2010) argue that earnings quality can only be defined with respect to a specific decision setting. In this spirit, we focus specifically on the role of accounting information in enhancing the ability of outside investors and regulators to monitor and discipline bank risk taking. While a large literature has examined smoothing via loan loss provisions, our paper is the first to investigate the economic consequences of key characteristics of loan loss provisioning regimes, including smoothing, on banks' risk-taking behavior. Overall, our evidence suggests that increasing discretion over loan loss provisioning to allow for a more forward-looking orientation involves a risk of unintended consequences with respect to discipline exerted over bank risk taking activities. In particular, we show that the consequences of discretion depend specifically on how the discretion is exploited by bank managers. Smoothing via loan loss provisions (implicit forward-lookingness) dampens discipline over bank risk taking, while explicit forward-lookingness appears to enhance discipline. This latter result complements Beatty and Liao (2011) who provide evidence that forward-looking provisioning mitigates pro-cyclicality in lending.

Our paper also contributes to the growing literature on bank transparency and market discipline as important components of effective bank regulation (e.g., Flannery 1998, Rochet 2005, and Barth et al. 2004). Viewing accounting information as a key mechanism underpinning transparency, we provide evidence that the effectiveness of accounting information in supporting discipline of bank risk-taking is intricately related to characteristics of loan provisioning behavior. Bliss and Flannery (2002) emphasize that effective market discipline has two different components. The first is outsiders' ability to accurately assess the condition of a firm, and the

second is the ability to affect managerial actions. While changes in prices of banks' outstanding securities can trigger outside scrutiny, our results suggest that disaggregated accounting information facilitates the process by providing information on sources of changes in price consistent with textured accounting information being an important ingredient for converting the monitoring role of prices into disciplinary influence.

Finally our paper complements several recent papers that examine direct consequences of banks' accounting discretion. Huizinga and Laeven (2009) examine accounting discretion by U.S. banks during the 2007-2008 time frame, documenting that banks used discretion to overstate the value of distressed assets, and that banks with large exposures to mortgage-backed securities provisioned less for bad loans. Also, Vyas (2009), using a novel measure of financial reporting transparency, shows that for U.S. financial institutions during the ongoing financial crisis, exposure to risky assets is reflected in stock prices on a timelier basis for transparent firms.

The rest of the paper is organized as follows. Section 2 puts our paper in context relative to the extant research on bank accounting and transparency, and also on the role of market discipline as complementary aspect of bank regulation. Section 3 presents the main empirical analysis on the relations between country-level provisioning regimes and the discipline of bank risk-taking. Section 4 concludes.

2. Related Literature

In section 2.1 we discuss the relation of our research to existing literature on earnings quality, smoothing and loan loss provisioning. In section 2.2 we relate our paper to the literature on the role of market discipline in the regulation of banks and the literature focused on understanding what works best in bank regulation and supervision. Finally, section 2.3 describes

how we draw from the extant literature in order to carefully control for other aspects of bank regulatory regimes as well as institutional features of the country in general.

2.1 Earnings quality, smoothing and loan loss provisioning

A large literature investigates the concept of earnings quality, where banks and other financial institutions are typically excluded from such analyses due to their unique characteristics. In a recent review of the earnings quality literature, Dechow et al. (2010) provide a useful framework for thinking about the study of earnings quality. Dechow et al. (2010) define higher quality earnings as providing more information about the features of a firm's financial performance that are relevant to a specific decision made by a specific decision-maker. An implication is that earnings quality can only be defined in the context of a specific decision setting. In this regard, the specific decision context we investigate involves the use of accounting information in enhancing the ability of outside investors and regulators to monitor and discipline bank risk taking. We isolate three distinct characteristics of countries' loan loss provisioning regimes and examine the relation between the three "quality" characteristics and both the sensitivity of changes in bank capital to changes in the risk of a bank's assets and the observed risk-shifting behavior of banks. This specific decision context distinguishes our study from the existing earnings quality literature and the literature on bank loan loss provisioning. In addition, with the exception of Beatty and Liao (2011), our measures of the forward-lookingness of loan provisions are new to the literature and we are the first to examine them in the context of discipline of bank risk-taking behavior.

Dechow et al. (2010) also note that the study of earnings quality is complicated by the fact that a firm's earnings depends on both the firm's financial performance and on the accounting system that measures it, implying that the value of a particular accounting measure

may vary with different types of enterprises. By focusing solely on banks, we minimize innate differences in the wealth generating process across firms in our sample. Also note that during our sample period, banks in different countries were subject to a range of different accounting rules with respect to loan loss provisions. Our research strategy exploits this variation to extract manifestations of discretion. We control for a set of non-discretionary fundamentals directly associated with loan losses and extract measures of smoothing and forward-lookingness that are orthogonal to the non-discretionary fundamentals. The set of non-discretionary control variables (see section 3.2 below) is consistent with a large literature that empirically models the loan provisioning decision, including cross-country studies by Laeven and Majnoni (2003), Bikker and Metzmakers (2004), Fonseca and Gonzalez (2008), and Gebhardt and Novotny-Farkas (2011). Thus, we abstract away from specific accounting rules and measure accounting discretion in all countries relative to a consistent set of non-discretionary fundamentals.

Finally, Dechow et al. (2010) classify research on earnings quality into one of two groups according to whether it provides evidence on the determinants or the consequences of the earnings quality proxy it examines. There exists a significant literature examining the use of discretionary loan loss provisioning to smooth earnings that can be roughly characterized as “determinants” studies. Such papers include Greenwald and Sinkey (1988), Beatty et al. (1995), Collins et al. (1995), Ahmed et al. (1999), Laeven and Majnoni (2003), Bikker and Metzmakers (2004), Liu and Ryan (2006), Fonseca and Gonzalez (2008), Pérez (2008), and Gebhardt and Novotny-Farkas (2011), among others.

We are the first paper to explore the consequences of discretionary smoothing and forward-looking provisioning for bank risk-taking behavior.⁹ The banking setting allows us to investigate how specific aspects of discretion in loan provisioning impact two crucial elements of banks' risk-taking behavior. The idea that capital should be an increasing function of risk is reflected in the risk-weighted capital requirements laid out in the Basel II Accord. This idea motivates our tests of how the sensitivity of changes in bank leverage (or capital) to changes in risk is impacted by various aspects of discretion in loan provisioning. The fact that implicit and explicit deposit insurance creates incentives for banks to shift risk onto the government has been recognized in the academic literature since at least Merton (1977), motivating our tests of how risk-shifting is impacted by various aspects of discretion in loan provisioning. We show that the consequences of discretion depend specifically on how the discretion is exploited by bank managers. Our results complement Beatty and Liao (2011) who provide evidence that forward-looking provisioning may mitigate pro-cyclicality in lending.

2.2 Market Discipline as a Bank Regulatory Tool

The premise that financial accounting information can play a fundamental role in the prudential oversight of banks is consistent with the Basel II Capital Accord which posits a central role for informational transparency in bank regulation in facilitating market discipline.¹⁰

While Basel Pillar 3 envisions a range of disclosures that may or may not be part of the formal

⁹ A long standing debate in the literature concerns whether earnings smoothing increases the information content of earnings by revealing innate fundamentals or whether it obscures fundamentals and reduces information in earnings. While some argue that income smoothing reveals information (e.g., Arya et al., 2003; Chaney and Lewis, 1995; Tucker and Zarowin, 2006; Trueman and Titman, 1988; Sankar and Subramanyam, 2001; Demski, 1998), others argue that income smoothing distorts information (e.g., Barth et al., 2007a, 2007b; Francis et al., 2004; Lang et al., 2003; Leuz et al., 2003). We are able to shed light on this debate in the specific context of bank-risk-taking.

¹⁰ The Basel Committee on Banking Supervision (BCBS) (2001) notes "Market discipline imposes strong incentives on banks to conduct their business in a safe, sound and efficient manner, including an incentive to maintain a strong capital base as a cushion against potential future losses arising from risk exposures."

financial accounting rules of a given country (BCBS (2001), financial accounting systems form the foundation of the firm-specific information set available to interested parties outside the firm and are a logical starting point for investigating properties of information important for addressing moral hazard problems at banks. It is also plausible that the quality of banks' financial accounting information is correlated with the quality of bank disclosures that fall outside of a country's financial accounting rules. Bank transparency can complement prudential supervision by supporting the financial analysis of banks by private investors which, by impounding such information into prices, can supplement the information already possessed by supervisors (Rochet (2005), Hovakimian and Kane (2000), Kane (2004), and Flannery and Thakor (2006)). Transparency may also enhance ex-ante discipline on bank risk taking activities as managers will anticipate that informed investors in uninsured liabilities will be more likely to discern increased risk-taking and respond quickly to greater risks by demanding higher yields on their investments.¹¹

Barth, Caprio, and Levine (2004) examine regulations on capital adequacy, deposit insurance system design features, bank supervisory power, regulations fostering information disclosure and private sector monitoring of banks, and government ownership of banks, among other factors. Their main results suggest that policies relying on regulatory features that foster accurate information disclosure, empower private-sector oversight of banks, and foster incentives for private agents to exert corporate control work best to promote bank development, performance and stability. Further, Beck, Demirgüç-Kunt, and Levine (2006) find that a

¹¹ Better disclosure may not beneficially impact bank risk taking behavior. For example, Blum (2006) demonstrates that benefits of market discipline via subordinated debt contracts depends on the ability of banks to credibly commit to a given risk level. Cordella and Yeyati (1997) show that public disclosure can reduce bank risk taking, but only if the bank controls the risk of its portfolio. Plantin, Sapra and Shin (2007) and Allen and Carletti (2008) focus on potential negative effects of mark-to-market accounting on bank soundness.

supervisory strategy that empowers private monitoring of banks by forcing banks to disclose accurate information to the private sector tends to lower the degree to which corruption of bank officials is an obstacle to firms raising external finance.

Demirgüç-Kunt, Detragiache, and Tressel (2008) study whether compliance with the Basel Core Principles for Effective Banking Supervision improves bank soundness. They document that countries which require banks to regularly and accurately report their financial data to regulators and market participants have sounder banks (measured with Moody's financial strength ratings). They note that these findings highlight the importance of transparency in making supervisory processes effective and strengthening market discipline. Tadesse (2006), using a range of survey-based metrics find that banking crises are less likely in countries with greater regulated disclosure and transparency.

Finally, Nier and Baumann (2006) look at the role of bank transparency in providing incentives for banks to limit their risk. Where we focus on risk shifting behavior, Nier and Baumann (2006) look at the extent to which higher levels of transparency enhance market discipline and provide more incentives for banks to limit their risk of default by holding larger capital buffer. Nier and Baumann's primary measure of transparency is a bank level index of disclosure constructed by counting the number of individual disclosures available from BankScope.

Our paper complements and extends this literature by demonstrating that the extent of market discipline may depend not only on the existence of informed market prices, but also on the availability of more textured information provided in banks financial reports that combines with price triggers to facilitate disciplinary actions by regulators and investors. Our focus on publicly traded banks implies that all banks in our sample have prices available, and so

differences in market discipline across banks must depend on more than just the existence of market prices. We conjecture that while prices transmit aggregated information that can trigger outside scrutiny of the bank's activities, supplementing this aggregated information with more textured information amplifies the intensity of disciplinary responses. Stock price changes reflect shifts in a bank's perceived value, where credible, disaggregated information in the bank's accounting reports can aid regulators and others in understanding the source of changes in firm value. This conjecture is related to the distinction between monitoring and influence raised by Bliss and Flannery (2002), where we are contending that textured financial information is a key element for converting the monitoring role of prices into disciplinary actions by outsiders.

It is also important to distinguish our analysis from Laeven and Levine (2009) who focus on conflicts between bank managers and owners over risk, and document that bank risk is generally higher in banks that have large owners with substantial cash flow rights. While we do not have data to control for intricate aspects of bank governance, it also not our objective to focus on the level of risk that bank takes. Instead, we explore whether the sensitivity of bank leverage (capital) to changes in risk varies with accounting discretion.

2.3 Controlling for other aspects of bank regulatory regime

To isolate the economic consequences of discretion in loan loss provisioning, it is crucial to control for other key aspects of countries' bank regulatory regimes as well as other country-level institutions. Barth, Caprio and Levine (2006) design and implement a survey funded by the World Bank to collect information on an extensive array of bank regulations and supervisory practices for many countries. We rely on Barth, Caprio and Levine (2006) as our source of bank regulatory variables, and supplement this with variables from other sources. All variables and

their sources are described in detail in Appendix A of the paper. We control for these elements as follows:

Regulations on capital adequacy: *CapIndex* which is an index constructed by Barth, Caprio and Levine (2006) to measure the stringency of the capital requirements in each country. This controls for Basle pillar I.

Supervisory power: *Official* is a measure of the official supervisory power that bank regulators have over the operations of the bank, serving as a control for Basle pillar II. This measure is from Barth, Caprio and Levine (2006) and represents an index constructed from answers to individual questions contained in the survey of bank regulatory practices.

Private-sector monitoring of banks: We include a control variable, *Private*, developed by Barth, Caprio, and Levine (2006) which captures the extent to which bank regulations in a country foster accurate information disclosure, empower private-sector oversight of banks, and create incentives for private agents to exert corporate control over banks.

Properties of the general contracting environment: *Judicial* is an assessment of the efficiency and integrity of the country's legal system.

In robustness analyses, we include a wide range of additional control variables. These include *Disclosure*, which is a measure of the general disclosure requirements of a country's securities regulations; *Rights*, a measure of the investor protection rights present in the country; *StateBank*, to control for the extent of state ownership of banks; *Liquidity*, which measures the share turnover of a country's equity market, a common measure of market development; and *MrktCap*, which represents the total market capitalization of a country's stock market as a percentage of GDP, again a common measure of market development.

3. Empirical Analysis

3.1 Sample selection criteria

The sample period of our study spans 1995-2006. All bank financial statement data is taken from Bankscope and all market data is from Datastream. Country-level variables derive from five different sources; the World Development Indicators Database, Barth et al. (2006), Demirgüç-Kunt et al. (2005), La Porta et al. (1998), and La Porta et al. (2002). Detailed information concerning variable construction and data sources are included in Appendix A. To be included in our sample of banks when estimating our country-level metrics we require the bank to have all necessary bank-level financial data and country-level data spanning a period of at least three years. We also require that the bank have more than \$5 billion in total assets. For the country-level analysis we also trim the data at the 1 and 99 percentiles. These requirements result in a sample of 57,408 bank year observations over 27 different countries. Table 1 Panel A provides descriptive statistics on the sample. For our bank-level analysis we further require all the bank to have market data adequate enough to estimate $IPP, \frac{D}{V}$, and σ_v . We then trim the data at the 1 and 99 percentiles. These additional requirements yield a sample of 3,091 potential bank-year observations across 27 different countries.

3.2 Estimating country-level aspects of discretionary, forward-looking loss provisioning

We begin by estimating three distinct aspects of loan provisioning practices within a given country that can be construed as reflecting a forward looking orientation. As discussed earlier, we control for a set of non-discretionary fundamentals directly associated with loan losses and extract measures of smoothing and forward-lookingness that are orthogonal to the non-discretionary fundamentals. To separate discretionary from non-discretionary provisions, we estimate the following equation:

$$\begin{aligned}
LLP_{itj} = & \gamma_0 + \gamma_1 Eblp_{itj} + \gamma_2 \Delta NPL_{i,t+1,j} + \gamma_3 Loan\ Growth_{i,t+1,j} \\
& + \gamma_4 \Delta NPL_{i,t,j} + \gamma_5 \Delta NPL_{i,t-1,j} + \gamma_6 Loan\ Growth_{i,t,j} + \gamma_7 LLR_{i,t-1,j} \quad (1) \\
& + \gamma_8 CAP_{i,t-1,j} + \gamma_9 Size_{i,t-1,j} + \gamma_{10} \% \Delta GDP_{t,j} .
\end{aligned}$$

LLP_{itj} is the loan loss provision scaled by lagged total loans for bank i , in country j , for year t . Controls for non-discretionary fundamentals directly associated with loan losses include $\Delta NPL_{i,t,j}$ and $\Delta NPL_{i,t-1,j}$, contemporaneous and lagged changes in non-performing loans (scaled by lagged total loans), respectively, to capture observed changes in portfolio performance and ultimate collectability. We also include current period loan growth ($Loan\ Growth_{i,t,j}$) to control for any impact on loan provisions related to statistical provisioning applied to an increasing base of homogeneous loans (Liu and Ryan 2006), and also to control for increased riskiness of loans. Existing literature suggests that loan growth represents an important driver of the riskiness of banks (e.g., Foos et al. 2010), and so we include it to make sure earnings is not simply picking up risk.¹² The percentage change in GDP per capita ($\% \Delta GDP_{t,j}$) controls for macroeconomic trends in the overall economy. We also include beginning of the period loan loss reserve scaled by lagged total loans ($LLR_{i,t-1,j}$) and equity capital to total assets ($CAP_{i,t-1,j}$) at the beginning of the period. Finally, we include the natural logarithm of total assets ($Size_{i,t-1,j}$) to control for size effects.

Our main measures of forward-looking discretion in loan provisions are captured by the three coefficients γ_1, γ_2 and γ_3 in (1). First, *Smoothing* is captured by γ_1 , the coefficient on earnings before taxes and loan loss provisions ($Eblp_{itj}$). After controlling for fundamental

¹² In untabulated results, we also control for alternative measures of risk including the volatility of equity and the volatility of assets extracted from an option pricing framework with no qualitative differences in results.

determinants of loan losses, γ_1 picks up the extent to which banks record loss provisions based solely on the level of earnings without reference to information about the loan portfolio, recording large provisions because earnings are high and low provisions because earnings are low. This measure of smoothing has been widely used in the extant banking literature, including Greenwald and Sinkey (1988), Beatty et al. (1995), Collins et al. (1995), Ahmed et al. (1999), Laeven and Majnoni (2003), Bikker and Metzmakers (2004), Liu and Ryan (2006), Fonseca and Gonzalez (2008), Pérez (2008), and Gebhardt and Novotny-Farkas (2011), among others.

The second measure of forward-looking discretion is γ_2 , the coefficient on the subsequent period change in non-performing loans, $\Delta NPL_{i,t+1,j}$, which we will refer to as *Forward-NPL*. This measure captures the extent to which current provisions anticipate *future* deteriorations in the performance of the loan portfolio. Beatty and Liao (2011) also use future changes in non-performing loans to estimate forward-lookingness in loan loss provisions. The final measure of forward-looking discretion is γ_3 , the coefficient on loan growth in period t+1, *Loan Growth* $_{i,t+1,j}$, which we refer to as *Forward-LG*. *Forward-LG* captures the extent to which current provisions anticipate the trajectory of loan growth and the higher expected loan losses associated with such growth. Foos et al. (2010) document that loan growth increases the riskiness of banks and results in higher loan loss provisions in *subsequent* years.¹³

To provide an overview of the specification, we first estimate equation (1) using a pooled, time series regression using all banks in all countries in all years.¹⁴ Table 1 reports descriptive statistics of the sample in Panel A, while Panel B reports the coefficients from the

¹³ As an alternative measure, we also examine the coefficient γ_6 on contemporaneous loan growth, *Loan Growth* $_{i,t,j}$. This variable yields results similar to *Forward-LG*, but slightly weaker. This is likely due to the fact that, in addition to reflecting risk, current period loan growth also impacts current period provisions via statistical provisioning applied to an increasing base of homogeneous loans (Liu and Ryan (2006)).

¹⁴ That is, we utilize all banks with data available to estimate equation (1) regardless of whether the bank is publically traded or has the required data for our later analysis.

pooled estimation of (1). Consistent with prior cross-country research (e.g., Laeven and Majnoni (2003), Bikker and Metzmakers (2004), and Fonseca and Gonzalez (2008)), we find a positive and significant coefficient of .067 on $Ebllp_t$, indicating that on average banks around the world smooth earnings via the loan loss provision. With respect to *Forward-LG*, the coefficient on future loan growth, $Loan\ Growth_{t+1}$, is negative and significant (-0.0011) implying that on average, future loan growth is negatively associated with current provisions. To the extent that loan growth is persistently high (low) during booms (busts), this negative coefficient is consistent with banks recording low (high) provisions during good (bad) times. An analogous interpretation applies to the significantly negative coefficient on $\% \Delta GDP$ (-0.0002) implying that provisions are inversely related to growth in the economy. Finally, with respect to *Forward-NPL*, the coefficient on future changes in non-performing loans, ΔNPL_{t+1} , is on average insignificantly different from zero.

To investigate consequences of discretion for risk discipline of banks, we require measures of discretionary, forward-looking provisioning at the country level. We thus estimate (1) by country and use the country-specific coefficients on $Ebllp_t$, $Loan\ Growth_{t+1}$, and ΔNPL_{t+1} to represent *Smoothing*, *Forward-LG* and *Forward-NPL*, respectively. Table 2 reports details of these country specific estimates. We see in Table 2, Panel A that there is considerable cross-country variation in our three measures of discretionary provisioning behavior. To control for outliers and estimation error in our country-level variables we dichotomize *Smoothing*, *Forward-LG* and *Forward-NPL*. Specifically, our empirical specifications employ a dummy

variable approach to represent each provisioning aspect, where the variable is set equal to 1 for coefficient values greater than or equal to the median value, and zero otherwise.¹⁵

Table 2 Panel B reports both the Spearman and Pearson correlations between our three measures of discretionary provisioning and measures of countries' bank regulatory regimes and other country-level institutions. We see that *Smoothing*, *Forward-LG* and *Forward-NPL* are uncorrelated using Spearman correlations, while Pearson correlations reflect a positive correlation between *Forward-LG* and *Forward-NPL*. *Smoothing* and *Forward-LG* are uncorrelated with bank supervisory power (*Official*), regulations on capital adequacy (*CapIndex*) and judicial efficiency of the legal system (*Judicial*), while *Forward-NPL* is negatively correlated with *Official* and positively correlated with *Private*. Recall *Private* captures the extent to which bank regulations in a country foster accurate information disclosure, empower private-sector oversight of banks, and create incentives for private agents to exert corporate control over banks. Barth et al. (2004) show that *Private* is associated with better bank development, performance and stability.

3.3 Loan Loss Provisioning and Risk-Taking – Sensitivity of Leverage to Changes in Risk

In this section, we take the first of two approaches to investigating the impact of discretionary provisioning on the discipline of bank risk taking behavior. We examine the effect that each of our three distinct aspects of forward-looking loan provisioning has on the sensitivity of changes in bank leverage (or capital) to changes in risk. The idea that capital should increase with risk has long been a basic tenet of prudential bank regulation as reflected, for example, in the risk-weighted capital requirements in the Basel II Accord. To operationalize this construct,

¹⁵ Results are robust to using the actual coefficient values, and to using alternative for *Forward-LG*, where the variable is set equal to 1 for coefficient values greater than or equal zero, and zero otherwise.

we follow Duan et al. (1992) and posit a linear equilibrium relation between changes in leverage (or equivalently, changes in capital) and changes in risk. Using this specification, we investigate how the sensitivity of changes in leverage to changes in risk varies with characteristics of countries' loan loss provisioning regimes. Specifically we estimate the following using OLS:

$$\Delta D/V = \alpha_0 + \alpha_1 \Delta \sigma_v + \alpha_2 \Delta \sigma_v * LLP \text{ REGIME} + \alpha_3 LLP \text{ REGIME} , \quad (2)$$

where D is the face value of debt, V is the market value of bank assets, $\Delta \sigma_v$ is the change in the volatility of bank assets, and $LLP \text{ REGIME}$ is either *Smoothing*, *Forward-LG* or *Forward-NPL*. The specification uses first differences where Δ is the change operator. To estimate V and σ_v we focus on publicly traded banks and exploit the concept that a firm's equity can be characterized as a call option on the firm's assets, where the strike price is the face value of debt. Using measures of face value of reported liabilities (D), the observed market value of equity, and the estimated standard deviation of stock returns, we obtain values for V and σ_v (see Appendix B for further details).

The idea behind (2) is that disciplinary pressure should generally result in $\alpha_1 < 0$, where banks decrease leverage (increase capital) in response to an increase in risk. We posit that stronger discipline should be associated with a greater sensitivity of leverage to risk (i.e., more negative values of α_1). To investigate whether loan-provisioning practices impede or promote disciplinary pressure, we include interactions of *Smoothing*, *Forward-LG* and *Forward-NPL* with $\Delta \sigma_v$. A result that $\alpha_2 > 0$ ($\alpha_2 < 0$) implies that a particular provisioning practice is associated with weaker (stronger) discipline of bank risk-taking. In estimating (2) we also include other country and bank level controls as both main effects and interactions.

Table 3 presents the results of the estimation of (2), where for brevity we do not report the main effects. In column I, we present a baseline result, documenting that across the whole sample $\alpha_1 < 0$, consistent with Duan et al. (1992) and the basic intuition that risk discipline pressures banks to decrease leverage in response to an increase in risk. In table 4, column II we find that the coefficient on the *Smoothing* interaction term is positive and significant (0.537, p-value < 0.05), consistent with discretion via *Smoothing* dampening (making less negative) the sensitivity of leverage to changes in risk. In contrast, columns III and IV show that the coefficients on the *Forward-LG* interaction term is -0.579 (p-value < 0.05) and that on *Forward-NPL* is -0.303 (but not significant), consistent with explicit forward-looking loan provisioning enhancing the disciplining of risk taking by increasing (making more negative) the sensitivity of leverage to changes in risk. In column V we include interactions for all three provisioning aspects simultaneously, where the *Smoothing* interaction is positive and significant (0.743, $p < 0.01$), and both the *Forward-LG* interaction (-0.951, $p < 0.01$) and the *Forward-NPL* interaction (-1.205, $p < 0.01$) are both negative and significant.

These results demonstrate that the impact of discretionary loan provisioning practices on risk discipline depends on precisely how discretion is manifested in loss provisioning behavior. However, these results speak only to relative risk restraining discipline across provisioning regimes, and do not address how the *level* of risk restraining discipline relates to the strength of banks' incentives to take risks. To prevent risk-shifting by banks the level of risk restraining discipline must offset banks' inherent incentives to increase risks without adequately compensating via increasing capital levels. In the next section, we address this issue by embedding the model of risk discipline posited in equation (2) into a model of risk-shifting that directly captures the competing inter-play of incentives to increase risk and risk discipline.

3.4 Discretion and Risk-Taking Behavior – Risk-Shifting

Deposit insurance provides an explicit or implicit guarantee that in the event of default by the bank, depositors will receive some proportion of the face value of the deposits.¹⁶ Merton (1977) characterizes deposit insurance as a put option written by the deposit insurer to the equity holders of the bank. Conceptually, the value of this option represents the fair insurance premium for deposit insurance provided. We utilize this put option framework to generate an empirical specification with which to estimate risk-shifting behavior by banks.

Merton (1977) derives a pricing model for the deposit insurance option for a bank as a function of the bank's volatility of assets and leverage. The existence of this option creates incentives for banks to shift risk onto the guarantee agency by increasing the risk of assets without simultaneously increasing capital adequately. Risk-shifting occurs when banks increase the value of the option without internalizing the full cost of the increased insurance.

Let IPP represent the value of the deposit insurance put option per dollar of deposits, σ_v the volatility of the value of the bank's assets, and D/V the leverage of the bank (defined as the face value of debt divided by the market value of the assets). Following Ronn and Verma (1986) and Duan et al. (1992), consider a linear approximation for the value of the put option:

$$IPP = \delta_0 + \delta_1 \sigma_v + \delta_2 D/V + \varepsilon_1. \quad (3)$$

Note that δ_1 and δ_2 in (3) represent the partial derivatives of IPP with respect to volatility and leverage, respectively.¹⁷ Because deposit insurers and uninsured creditors desire to impose discipline on the bank's risk taking, banks are not generally unconstrained in their choice of risk,

¹⁶ Under many deposit insurance schemes the full face value (or any fraction of the value) of the debt may not be explicitly guaranteed.

¹⁷ Merton (1977) derives the comparative static results that $\frac{\partial IPP}{\partial \sigma_v} > 0$ and $\frac{\partial IPP}{\partial D/V} > 0$.

leverage pairs. To incorporate this disciplinary force into (3), we revisit the equilibrium relation discussed above in section 3.3 that specifies leverage as a linear function of asset volatility (i.e., equation (2)). That is, consider the equilibrium relation:

$$D/V = \alpha_0 + \alpha_1 \sigma_v, \quad (4)$$

where again, $\alpha_1 < 0$ in (4) represents the natural equilibrium relation between risk and leverage. We embed this disciplinary force into (3) by substituting the right hand side of (4) into (3) for D/V and simplifying to yield

$$IPP = \beta_0 + \beta_1 \sigma_v + \varepsilon. \quad (5)$$

In (5), $\beta_1 \equiv \delta_1 + \delta_2 * \alpha_1 \equiv \frac{\partial IPP}{\partial \sigma_v} + \frac{\partial IPP}{\partial D/V} * \alpha_1$. The fundamental idea is that β_1 captures the net effect of the struggle between banks' incentives to increase risk and outside disciplining forces.

The first term comprising β_1 , $\delta_1 = \frac{\partial IPP}{\partial \sigma_v}$, captures a bank's direct incentives to increase risk,

while the second term, $\delta_2 * \alpha_1 = \frac{\partial IPP}{\partial D/V} * \alpha_1$, is generally negative as $\alpha_1 < 0$ and $\frac{\partial IPP}{\partial D/V} > 0$, and captures the *offsetting* impact of the disciplinary response to a bank's risk increasing incentives.

The overall interpretation is that $\beta_1 > 0$ is consistent with observed risk-shifting behavior as the disciplining effect does not completely neutralize incentives to increase risk. The economic intuition behind the interpretation of β_1 as observed risk-shifting behavior is that if banks find risk-shifting behavior beneficial (i.e. profit maximizing) then in equilibrium they will manage overall risk levels in such a way that would increase the actuarially fair value of the insurance. If banks do not find risk-shifting behavior to be advantageous, in equilibrium they would have no

incentive to manage their risk in such a way because any increases in the risk profile would be borne by the equity holders of the bank.

Following Duan et al. (1992), Hovakimian and Kane (2000), and Hovakimian, Kane and Laeven (2003), we estimate variants of (5) in changes to examine the relation between discretion and risk shifting. In particular, we estimate the following:

$$IPP = \beta_0 + \beta_1 \Delta\sigma_v + \beta_2 \Delta\sigma_v * LLPREGIME + \beta_2 LLPREGIME + \varepsilon, \quad (6)$$

where ΔIPP is the change in the fair deposit insurance premium (see Appendix B for calculation) and other variables are defined above. The coefficient β_2 captures the impact of discretionary loan loss provisioning on risk shifting, where $\beta_2 > 0$ would be consistent with higher discretion increasing risk shifting.

Table 4, panel B, column I reports the estimation of risk shifting forces in general across the entire sample, documenting that $\beta_1 > 0$. Consistent with Hovakimian et al. (2003), we find that on average banks' risk shifting incentives dominate the disciplinary pressure imposed on them by regulators and investors. Table 4, Panel B, columns II, III and IV, document the extent to which *Smoothing*, *Forward-LG* and *Forward-NPL*, respectively, exacerbate or reduce observed risk shifting. Column II shows that the coefficient on the *Smoothing* interaction term is positive and significant (0.068, p-value < 0.05), consistent with discretion via *Smoothing* increasing observed risk shifting. In contrast, column III shows that the coefficient on the *Forward-LG* interaction term is (-0.075, p-value < 0.01), consistent with reduced risk-shifting in these regimes. In column IV, we see that the coefficient *Forward-NPL* is small and positive, but not statistically different from zero. However, in column V we include interactions for all three provisioning aspects simultaneously, where the *Smoothing* interaction is positive and significant

(0.073, $p < 0.01$), and both the *Forward-LG* interaction (-0.096, $p < 0.01$) and the *Forward-NPL* interaction (-0.080, $p < 0.01$) are both negative and significant.

Analogous to the results in section 3.3, these results show that the impact of discretionary loan provisioning practices on observed risk-shifting depends on the precise manner in which such discretion is manifested in loss provisioning behavior. However, these results extend and complement the earlier results by showing how distinct aspects of loan provisioning regimes balance the competing inter-play of incentives to increase risk and risk discipline. In countries allowing high levels of smoothing, the incentives of banks to increase risk dominate the offsetting disciplinary pressures, resulting in more risk-shifting. In contrast, in regimes where discretionary provisioning anticipates future loan deterioration, the incentives of banks to increase risk are more than offset by disciplinary pressures, resulting in less risk-shifting.

3.5 Loan provisioning, performance and risk-taking behavior

To further explore the role of discretion and incentives to risk-shift, we draw on prior research that shows the incentives to risk-shift are higher for poorly performing firms (e.g., Eisdorfer 2008, Loktionov 2009). We examine this issue in Table 5, Panels A and B using two different specifications for poor performance. First, in Panel A, we measure performance with a bank's level of balance sheet capital (*CAP*). The basic idea of this analysis is that gains to banks' shareholders from risk-shifting should be higher as banks move closer to violating regulatory capital requirements. Because of data limitations on cross-country regulatory capital, we use balance sheet capital rather than regulatory capital.

Regulatory capital requirements for Tier 1 and/or Tier 2 capital for our sample ranges from 6-10% depending on the country. Given that our proxy for regulatory capital is noisy and regulators have the ability to exercise forbearance it is not obvious where the right cutoffs are for

our capital proxy in our panel of firms. With these considerations, we partition banks into three groups based on the whether a bank's level of balance sheet capital is less than 7%, between 7% and 10%, and greater than 10%. Our expectation is that risk-shifting incentives should be highest in the 7 to 10% range, where gains to banks' shareholders from risk-shifting are highest but the regulators have not yet assumed the bank.

Before considering loan provisioning behavior, columns 1, 2 and 3 of Table 5, Panel A report estimation of risk-shifting within each of the capital partitions. We see that risk-shifting is most significant in the 7-10% capital range, although there is modest evidence of risk-shifting in both the below 7% and above 10% partitions. We next run risk-shifting regressions within each of the three capital partitions, adding interactions of *Smoothing*, *Forward-LG* and *Forward-NPL* with risk. We see that when capital is greater than 10%, all three interactions have coefficients that are not statistically different from zero, indicating that loan provisioning does not impact risk-shifting in this range. For the lower capital ranges, the *Smoothing* interaction is positive and significant in both the 7-10% and the less than 7% capital ranges, indicating that smoothing exacerbates risk-shifting in both ranges. Both *Forward-LG* and *Forward-NPL* reduce risk-shifting in the low capital partitions, where *Forward-LG* has a negative and significant coefficient in 7-10% range and *Forward-NPL* has a negative and significant coefficient in less than range.

In Table 5, Panel B, we measure performance using banks' return on equity (*ROE*). We first partition banks by return on equity (*ROE*) into quintiles, and then take the top quintile as good performers and the bottom as poor performers. The first two columns of Panel B show that for poor performers, the coefficient on the change in risk is 0.1164 (p-value < 0.01), indicative of poor performers having strong incentives to risk shift. In contrast, for the high *ROE* group, the

coefficient on the change in risk is insignificantly different from zero. Turning now to impact of provisioning practices, we find for the high *ROE* group the coefficients on all three of the interaction terms (*Smoothing*, *Forward-LG* and *Forward-NPL* are not statistically different from zero. In contrast, for the low *ROE* group we see that *Smoothing* significantly increases observed risk-shifting (0.087, p-value < 0.05), while *Forward-LG* significantly reduces observed risk-shifting (-0.087, p-value < 0.01), and *Forward-NPL* has a negative, but insignificant coefficient.

3.6 Robustness

We first address basic issue of correlated omitted variables. We rerun our risk-shifting specification from table 4, but now include a wide range of additional variables that might affect risk shifting. All variables are defined in detail in Appendix A. First we include a measure of the general securities market disclosure in a country from LaPorta et al. (2006) (*Disclosure*). We also control for whether there is a high prevalence of state owned banks (*StateBank*) as such banking regimes may have differing incentives. To control for cross-country differences in shareholder rights, following LaPorta et al. (1998) we include a proxy for shareholder rights (*Rights*). Because the risk shifting analyses relies on market prices, we control for development of the equity markets in a country by including the country's market liquidity (*Liquidity*) (LaPorta et al., 2006), and the country's total stock market capitalization (*MrktCap*). Table 6, show that results are robust to the inclusion of these variables.

Another important issue revolves around the fact that we use stock prices to extract our estimates of the market value of assets, V , and risk, $\Delta\sigma_v$. As noted by Griffen et al. (2007), there can be differences across countries in market efficiency. To the extent that market efficiency differs across countries, our estimates of V and $\Delta\sigma_v$ could embed measurement error that varies

with market efficiency, and this measure error could be correlated with our estimates of discretion, *Smoothing*, *Forward-LG* and *Forward-NPL*. Following Griffen et al. (2007), we split countries into developed and undeveloped markets, and in untabulated results, we find that our results are not driven by cross-country differences in market efficiency.

Finally, we run a large array of additional robustness tests. First, consistent with prior research a large proportion of our sample is made up of banks from Japan and the US. For the U.S. and Japan we randomly select 100 firm-year observations from each country and using these observations in addition to the rest of observations from other countries in the analyses all results are robust. We also verify that our results are not attributable to any one country. We re-run all analyses sequentially excluding a different country each time, and find that the results presented in Tables 3-6 are qualitatively robust in all specifications. In particular, our results are robust to excluding Spain, which at some points during our sample period employed a dynamic provisioning regime for its banks (e.g., Fernández de Lis et al. (2001)). We also investigate concerns in regards to simultaneity bias in the leverage regressions. Following prior research (Hovakimian and Kane, 2001; and Hovakimian et al., 2003) we test for this bias using a Hausman Test and, consistent with prior literature, find no evidence of simultaneity present in the analysis.

4. Summary and Conclusions

In this paper, we explore consequences of discretion in loan loss provisioning for the role of accounting information in supporting outside discipline of bank risk-taking. Using a large sample of banks from 27 countries, we isolate three distinct aspects of discretionary loan provisioning practices within each country that reflect forward-looking orientation. We estimate one measure that is implicitly forward-looking, smoothing, and two measures that capture the

extent to which current period provisions explicitly anticipate future changes in non-performing loans and future loan growth, respectively. We document that discretionary provisioning in the form of earnings smoothing dampens disciplinary pressure on risk-taking, consistent with smoothing reducing bank transparency and inhibiting monitoring by outsiders. In contrast, aspects capturing the extent to which provisions explicitly anticipate future changes in non-performing loans and future loan growth are associated with enhanced discipline of bank risk-taking.

A main message of our paper is that discretion over bank loan loss provisioning can have potentially beneficial or negative real consequences for the discipline of bank risk-taking, depending specifically on how managers exploit available discretion to shape loan loss provisions. While discretionary smoothing via loan loss provisions (implicit forward-lookingness) appears to dampen discipline over bank risk taking, explicit forward-lookingness that captures the extent to which current provisions anticipate future deteriorations in the loan portfolio appears to enhance discipline. Although we cannot speak directly to a comparison of the incurred loss model with specific alternative models, our results suggest that it is possible that more forward-looking provisioning regimes can be designed that actually enhance discipline. Further, in designing such a regime in order to mitigate pro-cyclicality, great care must be exercised with respect to allowing more discretion into loan provisioning, as any gains to forward-looking provisioning can be swamped by losses in bank transparency due to opportunistic accounting choices.,

Appendix A

Variable	Description	Reference/Source
Smoothing	Defined as an indicator variable equal to 1 if the country-level coefficient on <i>Ebllp</i> from model (1) is above the median and 0 otherwise.	
Forward-LG	Defined as an indicator variable equal to 1 if the country-level coefficient on <i>Loan Growth_{t+1}</i> from model (1) is above the median and 0 otherwise.	
Forward-NPL	Defined as an indicator variable equal to 1 if the country-level coefficient on ΔNPL_{t+1} from model (1) is above the median and 0 otherwise.	
LLP	The reported loan loss provision on the income statement the end of the period scaled by lagged total loans outstanding.	Bankscope
Ebllp	Earnings before taxes and loan loss provisions scaled by lagged total loans	Bankscope
Loan Growth	The percentage change in the loans over the period	Bankscope
ΔNPL	The change in non-performing loans over the reporting period scaled by total loans outstanding.	Bankscope
LLR	The lagged level of the loan loss reserve scaled by lagged total loans outstanding.	Bankscope
CAP	Book value of equity reported at the end of the period scaled by end of period total assets.	Bankscope
Size	Natural logarithm of total assets.	Bankscope
$\% \Delta GDP$	Percentage change in GDP per capita.	World Development Indicators
Official	An index computed from answers to the following questions: (a) Does the supervisory agency have the rights to met with external auditors to discuss their reports without the approval of the bank?; (b) Are auditors required by law to communicate directly to the supervisory agency and presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse?; (c) Are offbalance sheet items disclosed to the supervisors?; Can supervisors: (d) take legal action against external auditors for negligence?; (e) force a bank to change its internal organizational structure?; (f) order a bank's directors or management to constitute provisions to cover actual or potential losses?; (g) suspend the directors' decision to distribute bonuses?; (h) suspend the director's	Barth, Caprio and Levine (2006, 2007)

decision to distribute management fees?; (i) Who can legally declare – such that this declaration supersedes some of the rights of shareholders – that a bank is insolvent?; (j) According to the Banking Law, who has authority to intervene – that is, suspend some or all ownership rights – a problem bank?; Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency: (k) supersede shareholder rights?; (l) remove or replace management?; and (m) remove and replace directors?

CapIndex	A composite measure that captures both the amount of capital and verifiable sources that a bank is required to possess. The index is created from answers to the following questions as of 2003: 1) Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities? 2) Can the initial disbursement of subsequent injections of capital be done with assets other than cash or government securities? 3) Can initial disbursement of capital be done with borrowed funds? 4) Is the minimum capital-asset ratio risk-weighted in line with the Basel guidelines? 5) Does the minimum ratio vary as a function of market risk? 6) Are market value of loan losses not realized in accounting books deducted? 7) Are unrealized losses in securities portfolios deducted? 8) Are Unrealized foreign exchange losses deducted?	Barth, Caprio and Levine (2006, 2007)
Private	A composite index comprised of answers to the following questions: 1) Is there an explicit deposit insurance protection scheme? 2) Does accrued, though unpaid interest/principal enter the income statement while the loan is still non-performing? 3) Are financial institutions required to produce consolidated accounts covering all bank and any non-financial subsidiaries? 4) Must banks disclose their risk management procedures to the public? 5) Are all of the top ten banks in the country rated by international credit rating agencies?	Barth, Caprio and Levine (2006, 2007)
Judicial	Assessment of the “efficiency and integrity of the legal environment as it affects business, particularly foreign firms” produced by the country-risk rating agency Business International Corporation. Average between 1980 and 1993. Scale between 0 to 10, with lower scores equal to lower efficiency levels.	LaPorta, Lopez-de-Silanes, Shleifer and Vishny (1998)
$\Delta\sigma_v$	The change in the underlying risk of the assets, see Appendix B for computation details.	Ronn and Verma (1986)
$\Delta D/V$	The change in the face value of debt as of the end of the fiscal period divided by the market value of the assets (see Appendix B for computation details).	Ronn and Verma (1986)
ROE	Return on equity defined as earnings before taxes scaled by owner’s equity.	Bankscope

Disclosure	A measure of disclosure created from components of the general securities law disclosure requirements.	LaPorta, Lopez-de-Silanes, and Shleifer (2006) (LLS)
StateBank	Share of the assets of the top 10 banks in a given country owned by the government of that country.	LaPorta, Lopez-de-Silanes and Shleifer (2002)
Rights	A summary measure of shareholder rights in a country, measured as the number of important shareholder rights that exist in the country's legal code.	LaPorta, Lopez-de-Silanes, Shleifer and Vishny (1998)
Liquidity	The average total value of stocks traded as a percentage of GDP for the period 1996 to 2000.	WDI/LLS
MrktCap	The countries total market capitalization divided by GDP	WDI
EfficientMrkt	And indicator variable equal to 1 if the market is developed and 0 otherwise.	Griffin, Kelly, and Nadrin (2007)

Appendix B

Estimating V , σ and IPP :

To estimate V -the market value of assets, σ -the instantaneous standard deviation of the rate of return on the value of the bank's assets, and IPP -the fair value of the deposit insurance put-option per dollar of deposit. To estimate each of these variables we follow Ronn and Varma (1986).

We first obtain value of V and σ by solving two simultaneous equations. The solutions from these two equations are then used to calculate IPP . We like prior research make the following assumptions: first, deposits equal the total liabilities of the bank. Second, asset values follow a geometric Brownian motion. Third, because deposits are of the demand type we assume the time to maturity is the time to the next audit this way the guarantor can treat the deposits as if they were term and interest bearing.

The first equation states σ as a function of market value of equity (E), V , and the instantaneous standard deviation of return on equity over the prior twelve-month period (σ_E):

$$\sigma_v = \frac{\sigma_E E}{VN(x)} \quad (a)$$

where

$$x \equiv \frac{\ln(V/\rho D) + \sigma_v^2 T/2}{\sigma_v \sqrt{T}}$$

$N(\cdot)$ is the cumulative density of a standard normal random variable. ρ is the forbearance parameter to capture regulators desire to stay the exercise of the option in hopes of a recovery in the bank. Following prior research we set this parameter equal to 0.97, which allows the asset value to deteriorate to 97 percent of the debt value before the option is called. T is the unit of time until the next audit, which is set equal to 1. The second equation is the option formulation for E . Following Merton (1977) and Ronn and Verma (1986) we model the market value of the bank's equity as:

$$E = VN(x) - \rho DN(x - \sigma_v \sqrt{T}) \quad (b)$$

where all variables are defined previously.

After simultaneously solving (a) and (b) for V and σ , we then solve for Merton's (1977) fair value of the deposit insurance put-option, IPP :

$$IPP = N(y + \sigma_v \sqrt{T}) - (1 - \delta)^n \left(\frac{V}{D} \right) N(y) \quad (c)$$

where

$$y \equiv \frac{\ln[D/V(1-\delta)^n] - \sigma_v^2 T/2}{\sigma_v \sqrt{T}}$$

and δ is the dividend per dollar of value of the assets, paid n time per period. The resulting *IPP* is the deposit insurance put-option (or actuarial fair insurance premium) per dollar of deposits

Table 1 Pooled Estimation of the Determinants of Loan Loss Provisions

OLS regression of loan loss provisions (*LLP*) on earnings before provisions and tax (*Ebllp*), change in non-performing loans (ΔNPL), beginning period loan loss reserves (*LLR*), capital (*CAP*), the natural logarithm of the bank's assets (*Size*), percent growth in loan portfolio (*Loan Growth*) and percentage change in GDP per capita ($\% \Delta GDP$). Bank specific variables are trimmed at the 1 and 99 percentiles. Standard errors (reported) are clustered at the bank level. Country, bank type and year fixed effects are included. Data range 1995-2006.

Panel A. Descriptive Statistics

Variable	Mean	Median	StdDev
LLP_t	0.0045	0.0025	0.0103
$Ebllp_t$	0.0299	0.0268	0.0599
$Loan\ Growth_t$	0.1297	0.0859	0.2529
ΔNPL_t	0.0007	0.0000	0.0129
CAP_{t-1}	0.1527	0.1400	0.0471
LLR_{t-1}	0.0170	0.0143	0.0147
$Size_{t-1}$	5.5067	5.0265	1.9966
$\% \Delta GDP_t$	1.8444	1.6976	1.1567

Panel B. OLS Regression – Smoothing via LLP_t

Variable	Dependent Variable: <i>LLP</i>
$Ebllp_t$	0.0667*** (0.0015)
$Loan\ Growth_{t+1}$	-0.0011*** (0.0002)
ΔNPL_{t+1}	-0.0031 (0.0051)
$Loan\ Growth_t$	0.0026*** (0.0003)
ΔNPL_t	0.1216*** (0.0091)
ΔNPL_{t-1}	0.0063*** (0.0109)
CAP_{t-1}	-0.0130*** (0.0010)
LLR_{t-1}	0.1404*** (0.0170)
$Size_{t-1}$	0.0001 (0.0001)
$\% \Delta GDP_t$	-0.0002** (0.0001)
R^2	0.3839
Observations	57,408

***, **, * indicates significance at the 0.01, 0.05 and 0.10 level respectively.

Table 2 Country-Level Statistics

Smoothing is the country-level coefficient from an OLS regression of loan loss provisions on earnings before provisions and tax (*Ebllp*). *Forward-LG* is the country-level coefficient from an OLS regression of loan loss provisions on *Loan Growth*_{t+1}. *Forward-NPL* is the country-level coefficient from an OLS regression of loan loss provisions on ΔNPL_{t+1} . *CapIndex*, *Private*, *Official*, *Judicial* and *GDP* are country-level control variables (see Appendix A).

Panel A. Descriptive Statistics

Country	N	Smoothing	Forward -LG	Forward- NPL	Official	CapIndex	Private	Judicial
Argentina	10	0.0620	-0.0011	0.0921	9.5	7	2.0	6.00
Australia	45	0.1082	0.0080	0.0154	11.0	7	4.0	10.00
Austria	18	0.4279	-0.0096	-0.0108	13.5	9	1.9	9.5
Canada	54	0.1291	-0.0017	0.0303	10.5	4	3.0	9.25
Chile	13	-0.0004	-0.0001	-0.0422	11.0	6	1.9	7.25
Germany	53	-0.0189	0.0003	0.0334	9.0	6	3.0	9.00
Hong Kong	22	-0.0791	-0.0037	0.0954	11.0	7	4.0	10.00
India	105	0.1682	0.0034	0.2122	10.0	8	0.3	8.00
Ireland	7	0.4232	0.0020	0.0941	13.0	4	3.0	8.75
Israel	35	0.0049	-0.0047	0.0193	8.0	7	3.5	10.00
Japan	269	0.1311	-0.0004	0.0050	12.0	6	3.0	10.00
Mexico	6	0.0382	-0.0011	0.0234	11.5	8	3.0	6.00
Netherlands	5	0.0535	-0.0121	-0.0001	8.0	6	2.0	10.00
Norway	56	0.1596	-0.0072	0.0360	9.0	7	3.0	10.00
Pakistan	61	-0.0314	-0.0018	-0.0257	13.0	7	2.4	5.00
Peru	17	0.5291	-0.0123	-0.0004	12.0	6	1.4	6.75
Philippines	60	0.1649	-0.0029	0.0132	11.0	5	2.9	4.75
Portugal	21	0.0457	-0.0017	-0.0359	14.0	7	2.8	5.50
Singapore	21	0.0091	0.0214	0.3381	12.5	8	4.0	10.00
South Africa	18	0.0093	-0.0037	0.1403	9.0	7	3.5	6.00
Spain	65	-0.0117	0.0004	0.0101	8.5	10	2.0	6.25
Switzerland	39	-0.0086	0.0020	0.0019	14.0	6	2.8	10.00
Thailand	48	0.1169	-0.0132	0.0245	9.0	5	3.0	3.25
Turkey	36	0.1542	0.0005	0.0506	14.0	6	2.9	4.00
U.K.	43	0.0926	-0.0091	0.0481	11.5	6	3.0	10.00
U.S.A.	1,954	0.0564	-0.0006	0.0001	13.0	6	2.0	10.00
Zimbabwe	10	0.0152	-0.0070	-0.0761	14.0	5	3.0	7.50
Mean		0.1018	-0.0021	0.0405	11.2	6.5	2.7	7.88
Median		0.0564	-0.0017	0.0193	11.0	6	3.0	8.75
StdDev		0.1463	0.0069	0.0835	2.0	1.4	0.8	2.21

Panel B. Correlation Matrix (Pearson-Lower/Spearman-Upper)

	Smoothing	Forward- LG	Forward- NPL	Official	CapIndex	Private	Judicial
Smoothing		-0.153	0.089	0.138	-0.242	-0.025	-0.086
Forward-LG	-0.279		0.249	0.213	0.174	0.058	0.078
Forward-NPL	-0.039	0.609**		-0.400**	0.146	0.439**	0.123
Official	0.234	0.221	-0.196		-0.144	-0.132	-0.077
CapIndex	-0.169	0.227	0.235	-0.154		-0.063	0.076
Private	-0.354	0.276	0.118	0.028	-0.182		0.292
Judicial	-0.013	0.189	0.173	-0.044	0.027	0.180	

** indicates significance at the 0.05 level respectively.

Table 3 Smoothing, Forward-LG, Forward-NPL and the Sensitivity of Leverage to Risk

OLS regression results of changes in debt-to-assets ($\Delta D/V$) on changes in asset risk ($\Delta\sigma_v$) interacted with country-level institutional features. $\Delta D/V$ is the face value of debt divided by the market value of assets and $\Delta\sigma_v$ is the change in the volatility of assets (see Appendix B for details). *Smoothing* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on earnings before provisions and tax (*Eblpp*) is above the median and 0 otherwise. *Forward-LG* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on *Loan Growth* $_{t+1}$ is above the median and 0 otherwise. *Forward-NPL* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on ΔNPL_{t+1} is above the median and 0 otherwise. *CapIndex*, *Private*, *Official*, *Judical* and *GDP* are country-level control variables (see Appendix A). *ROE* is bank level return on equity and *Size* is the natural logarithm of the bank's assets. Bank specific variables are trimmed at the 1 and 99 percentiles. For brevity main effects are included in regressions but not reported. Standard errors (reported) are clustered at the bank level. Both bank type and year fixed effects are included. Data range 1995-2006.

Panel A. Descriptive Statistics

Variable	Mean	Median	StdDev
$\Delta\sigma_v$	-0.0043	-0.0015	0.1255
$\Delta D/V$	-0.0055	-0.0020	0.2413
<i>SIZE</i>	8.0370	7.7936	1.7740
<i>ROE</i>	0.1212	0.1284	0.1753

Panel B. OLS Regressions – Capital Sensitivity

Variables	Dependent Variable: $\Delta D/V$				
	I	II	III	IV	V
$\Delta\sigma_v$ * <i>Smoothing</i>		0.537** (0.250)			0.743*** (0.222)
$\Delta\sigma_v$ * <i>Forward-LG</i>			-0.579** (0.300)		-0.951*** (0.268)
$\Delta\sigma_v$ * <i>Forward-NPL</i>				-0.303 (0.264)	-1.205*** (0.272)
$\Delta\sigma_v$ * <i>Official</i>		-0.224*** (0.051)	-0.163** (0.067)	-0.223*** (0.047)	-0.236*** (0.053)
$\Delta\sigma_v$ * <i>CapIndex</i>		0.003 (0.133)	-0.035 (0.125)	-0.054 (0.128)	0.104 (0.128)
$\Delta\sigma_v$ * <i>Private</i>		0.297 (0.203)	-0.398** (0.185)	-0.298 (0.225)	0.165 (0.162)
$\Delta\sigma_v$ * <i>Judicial</i>		-0.125*** (0.048)	-0.141*** (0.044)	-0.188*** (0.044)	-0.077* (0.048)
$\Delta\sigma_v$ * <i>Size</i>		-0.141** (0.066)	-0.097 (0.065)	-0.149*** (0.054)	-0.121** (0.054)
$\Delta\sigma_v$ * <i>ROE</i>		-0.009 (0.209)	-0.119 (0.249)	0.026 (0.185)	-0.076 (0.185)
$\Delta\sigma_v$ * <i>GDP</i>		-0.104*** (0.040)	-0.101*** (0.037)	-0.095** (0.043)	-0.085** (0.034)
$\Delta\sigma_v$	-1.170*** (0.237)	4.122*** (1.401)	4.145*** (1.288)	5.360*** (1.420)	2.56 ** (1.250)
R ²	0.4141	0.5386	0.5471	0.5328	0.5820
Observations	3,091	3,091	3,091	3,091	3,091

***, **, * indicates significance at the 0.01, 0.05 and 0.10 level respectively.

Table 4 Smoothing, Forward-LG, Forward-NPL and Risk-Shifting

OLS regression results of changes in IPP (ΔIPP) on changes in asset risk ($\Delta\sigma_v$) interacted with country-level institutional features. Following Merton (1977) ΔIPP is the fair value of the deposit insurance premium per dollar of deposits and $\Delta\sigma_v$ is the change in the volatility of assets (see Appendix B for details). *Smoothing* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on earnings before provisions and tax (*Eblpp*) is above the median and 0 otherwise. *Forward-LG* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on *Loan Growth*_{t+1} is above the median and 0 otherwise. *Forward-NPL* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on ΔNPL _{t+1} is above the median and 0 otherwise. *CapIndex*, *Private*, *Official*, *Judicial* and *GDP* are country-level control variables (see Appendix A). *ROE* is bank level return on equity and *Size* is the natural logarithm of the bank's assets. Bank specific variables are trimmed at the 1 and 99 percentiles. For brevity main effects are included in the regression but not reported but are available upon requests. Standard errors (reported) are clustered at the bank level. Both bank type and year fixed effects are included. Data range 1995-2006.

Panel A. Descriptive Statistics

Variable	Mean	Median	StdDev
$\Delta\sigma_v$	-0.0043	-0.0015	0.1255
ΔIPP	-0.0004	-0.0001	0.0243
<i>SIZE</i>	8.0370	7.7936	1.7740
<i>ROE</i>	0.1212	0.1284	0.1753

Panel B. OLS Regressions – Capital Sensitivity

Variables	<i>Dependent Variable: ΔIPP</i>				
	I	II	III	IV	IV
$\Delta\sigma_v$ * <i>Smoothing</i>		0.068** (0.032)			0.073*** (0.029)
$\Delta\sigma_v$ * <i>Forward-LG</i>			-0.075*** (0.027)		-0.096*** (0.033)
$\Delta\sigma_v$ * <i>Forward-NPL</i>				0.009 (0.038)	-0.080** (0.040)
$\Delta\sigma_v$ * <i>Official</i>		-0.013 (0.011)	-0.005 (0.012)	-0.010 (0.101)	-0.011 (0.011)
$\Delta\sigma_v$ * <i>CapIndex</i>		-0.016 (0.022)	-0.019 (0.022)	-0.024 (0.022)	-0.008 (0.025)
$\Delta\sigma_v$ * <i>Private</i>		-0.049** (0.021)	-0.063*** (0.020)	-0.066** (0.028)	-0.021 (0.028)
$\Delta\sigma_v$ * <i>Judicial</i>		-0.005 (0.007)	-0.007 (0.007)	-0.011 (0.007)	-0.001 (0.007)
$\Delta\sigma_v$ * <i>Size</i>		-0.024*** (0.008)	-0.018** (0.007)	-0.023*** (0.008)	-0.020*** (0.007)
$\Delta\sigma_v$ * <i>ROE</i>		0.027 (0.033)	0.013 (0.035)	0.027 (0.032)	0.016 (0.032)
$\Delta\sigma_v$ * <i>GDP</i>		-0.004 (0.007)	-0.004 (0.006)	-0.004 (0.007)	-0.004 (0.007)
$\Delta\sigma_v$	0.104*** (0.030)	0.691** (0.321)	0.691** (0.310)	0.825*** (0.315)	0.545* (0.343)
R ²	0.3481	0.5254	0.5388	0.5114	0.5593
Observations	3,091	3,091	3,091	3,091	3,091

***, **, * indicates significance at the 0.01, 0.05 and 0.10 level respectively.

Table 5 Smoothing, Forward-LG, Forward-NPL and Risk-Shifting: Controlling for Poor Performance

Panel A. Capital Levels

OLS regression results of changes in IPP (ΔIPP) on changes in asset risk ($\Delta\sigma_v$) interacted with country-level institutional features. Following Merton (1977) ΔIPP is the fair value of the deposit insurance premium per dollar of deposits and $\Delta\sigma_v$ is the change in the volatility of assets (see Appendix B for details). *Smoothing* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on earnings before provisions and tax ($Ebllp$) is above the median and 0 otherwise. *Forward-LG* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on $Loan\ Growth_{t+1}$ is above the median and 0 otherwise. *Forward-NPL* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on ΔNPL_{t+1} is above the median and 0 otherwise. *CapIndex*, *Private*, *Official*, *Judicial* and *GDP* are country-level control variables (see Appendix A). *ROE* is bank level return on equity and *Size* is the natural logarithm of the bank's assets. Bank specific variables are trimmed at the 1 and 99 percentiles. For brevity main effects are included in the regression but not reported but are available upon requests. Standard errors (reported) are clustered at the bank level. Both bank type and year fixed effects are included. Data range 1995-2006.

	Dependent Variable: ΔIPP					
	Cap < 7%	7% ≤ Cap ≤ 10%	Cap > 10%	Cap < 7%	7% ≤ Cap ≤ 10%	Cap > 10%
$\Delta\sigma_v$ * <i>Smoothing</i>				0.106*** (0.0032)	0.095*** (0.033)	-0.109 (0.070)
$\Delta\sigma_v$ * <i>Forward-LG</i>				0.011 (0.015)	-0.069** (0.030)	-0.053 (0.067)
$\Delta\sigma_v$ * <i>Forward-NPL</i>				-0.135*** (0.032)	0.028 (0.080)	0.090 (0.106)
$\Delta\sigma_v$ * <i>Official</i>				0.012** (0.006)	0.023 (0.021)	-0.015 (0.012)
$\Delta\sigma_v$ * <i>CapIndex</i>				0.022** (0.010)	0.031 (0.022)	-0.070 (0.043)
$\Delta\sigma_v$ * <i>Private</i>				0.023 (0.022)	-0.043 (0.030)	-0.027 (0.039)
$\Delta\sigma_v$ * <i>Judicial</i>				-0.015*** (0.005)	-0.015 (0.012)	-0.022 (0.016)
$\Delta\sigma_v$ * <i>Size</i>				-0.008*** (0.003)	-0.012 (0.008)	-0.005 (0.020)
$\Delta\sigma_v$ * <i>ROE</i>				0.012 (0.008)	0.082 (0.052)	0.042 (0.059)
$\Delta\sigma_v$ * <i>GDP</i>				0.002 (0.008)	-0.010* (0.005)	-0.007 (0.006)
$\Delta\sigma_v$	0.034* (0.020)	0.173*** (0.051)	0.078* (0.040)	-0.083 (0.140)	-0.097 (0.313)	1.029** (0.039)
R ²	0.4639	0.7143	0.2495	0.7185	0.9364	0.4092
Observations	864	1,315	912	864	1,315	912

***, **, * indicates significance at the 0.01, 0.05 and 0.10 level respectively.

Table 5
Panel B. ROE

OLS regression results of changes in IPP (ΔIPP) on changes in asset risk ($\Delta\sigma_v$) interacted with country-level institutional features. Following Merton (1977) ΔIPP is the fair value of the deposit insurance premium per dollar of deposits and $\Delta\sigma_v$ is the change in the volatility of assets (see Appendix B for details). *Smoothing* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on earnings before provisions and tax (*Ebltp*) is above the median and 0 otherwise. *Forward-LG* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on *Loan Growth* $_{t+1}$ is above the median and 0 otherwise. *Forward-NPL* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on ΔNPL_{t+1} is above the median and 0 otherwise. Standard errors (reported) are clustered at the bank level. Both bank type and year fixed effects are included. Data range 1995-2006.

Variables	<i>Dependent Variable: ΔIPP</i>			
	Low ROE	High ROE	Low ROE	High ROE
$\Delta\sigma_v * Smoothing$			0.087** (0.038)	0.036 (0.023)
$\Delta\sigma_v * Forward-LG$			-0.087*** (0.031)	-0.052 (0.086)
$\Delta\sigma_v * Forward-NPL$			-0.052 (0.069)	-0.066 (0.083)
$\Delta\sigma_v * Official$			-0.009 (0.013)	-0.014 (0.006)
$\Delta\sigma_v * CapIndex$			0.004 (0.022)	-0.002 (0.014)
$\Delta\sigma_v * Private$			-0.019 (0.040)	-0.032 (0.021)
$\Delta\sigma_v * Judicial$			-0.002 (0.013)	0.003 (0.007)
$\Delta\sigma_v * Size$			-0.018** (0.008)	-0.021** (0.011)
$\Delta\sigma_v * GDP$			-0.002 (0.007)	-0.011 (0.007)
$\Delta\sigma_v$	0.1164*** (0.046)	0.0511 (0.027)	0.431 (0.386)	0.519** (0.247)
R^2	0.5448	0.1533	0.7346	0.2367
Observations	618	619	618	619

***, **, * indicates significance at the 0.01, 0.05 and 0.10 level respectively.

Table 6 Smoothing, Forward-LG, Forward-NPL and Risk-Shifting: Additional Controls

OLS regression results of changes in IPP (ΔIPP) on changes in asset risk ($\Delta\sigma_v$) interacted with country-level institutional features. Following Merton (1977) ΔIPP is the fair value of the deposit insurance premium per dollar of deposits and $\Delta\sigma_v$ the change in the volatility of assets (see Appendix B for details). *Smoothing* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on earnings before provisions and tax (*Eblp*) is above the median and 0 otherwise. *Forward-LG* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on *Loan Growth* $_{t+1}$ is above the median and 0 otherwise. *Forward-NPL* is an indicator variable set equal to 1 if the country-level coefficient from an OLS regression of loan loss provisions on ΔNPL_{t+1} is above the median and 0 otherwise. *CapIndex*, *Private*, *Official*, *Judicial* and *GDP* are country-level control variables (see Appendix A). *ROE* is bank level return on equity and *Size* is the natural logarithm of the bank's assets. Bank specific variables are trimmed at the 1 and 99 percentiles. For brevity main effects are included in the regression but not reported but are available upon requests. Standard errors (reported) are clustered at the bank level. Both bank type and year fixed effects are included. Data range 1995-2006.

Variable	<i>Dependent Variable: ΔIPP</i>					
$\Delta\sigma_v$ *Smoothing	0.070** (0.032)	0.074*** (0.030)	0.068** (0.033)	0.067* (0.052)	0.071** (0.033)	0.077* (0.054)
$\Delta\sigma_v$ * <i>Forward-LG</i>	-0.091*** (0.029)	-0.096*** (0.033)	-0.106** (0.041)	-0.093*** (0.028)	-0.099*** (0.037)	-0.152** (0.074)
$\Delta\sigma_v$ * <i>Forward-NPL</i>	-0.069** (0.029)	-0.079** (0.039)	-0.067** (0.036)	-0.075** (0.034)	-0.078** (0.040)	-0.097** (0.045)
$\Delta\sigma_v$ *Disclosure	-0.022 (0.056)					0.108 (0.221)
$\Delta\sigma_v$ *StateBank		0.002 (0.065)				-0.051 (0.737)
$\Delta\sigma_v$ *Rights			-0.005 (0.058)			-0.167 (0.161)
$\Delta\sigma_v$ *Liquidity				0.000 (0.004)		0.001 (0.005)
$\Delta\sigma_v$ *MrktCap					-0.001 (0.010)	-0.001 (0.002)
$\Delta\sigma_v$ *Official	-0.011 (0.012)	-0.011 (0.011)	-0.007 (0.014)	-0.010 (0.015)	-0.011 (0.011)	0.001 (0.019)
$\Delta\sigma_v$ *CapIndex	-0.008 (0.024)	-0.009 (0.023)	-0.005 (0.024)	-0.008 (0.024)	-0.006 (0.022)	0.011 (0.013)
$\Delta\sigma_v$ *Private	-0.022 (0.026)	-0.021 (0.028)	-0.028 (0.026)	-0.023 (0.028)	-0.017 (0.031)	-0.034 (0.038)
$\Delta\sigma_v$ *Judicial	-0.001 (0.007)	-0.001 (0.008)	0.001 (0.007)	0.000 (0.009)	0.001 (0.008)	0.003 (0.011)
$\Delta\sigma_v$ *Size	-0.021*** (0.006)	-0.020*** (0.006)	-0.021*** (0.007)	-0.021*** (0.007)	-0.020*** (0.006)	-0.021*** (0.006)
$\Delta\sigma_v$ *ROE	0.016 (0.032)	0.015 (0.031)	0.016 (0.031)	0.015 (0.031)	0.016 (0.031)	0.022 (0.030)
$\Delta\sigma_v$ *GDP	-0.004 (0.007)	-0.003 (0.007)	-0.003 (0.007)	-0.004 (0.007)	-0.003 (0.006)	-0.003 (0.007)
$\Delta\sigma_v$	0.559* (0.320)	0.544* (0.360)	0.516* (0.355)	0.537* (0.350)	0.521* (0.354)	0.376* (0.280)
R ²	0.5599	0.5593	0.5621	0.5610	0.5605	0.5708
Observations	3,084	3,084	3,084	3,084	3,084	3,084

***, **, * indicates significance at the 0.01, 0.05 and 0.10 level respectively.

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