

Dynamic Provisioning: A Countercyclical Tool for Loan Loss Reserves

Eliana Balla and Andrew McKenna

The methodology to recognize loan losses set forth by the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) is referred to as the incurred loss model and defined as the identification of inherent losses in a loan or portfolio of loans. Inherent credit losses, under current accounting standards in countries following FASB and IASB, are event driven and should only be recognized upon an event's occurrence.¹ This has tended to mean that reserves for loan losses on a bank's balance sheet need to grow significantly during an economic downturn, a time associated with increased credit impairment and default events. Critics of the incurred loss model have pointed to it as one of the causes of the severity of strain many financial institutions experienced at the onset of the financial crisis of 2007–2009. As rapid provisioning to increase loan loss reserves made headlines, discussions of international regulatory banking reform included the method of dynamic provisioning as a potential alternative to the incurred loss approach (see, for example, Cohen 2009). Dynamic provisioning is a statistical method for loan loss provisioning that relies on historical data for various asset classes to determine the level of provisioning that should occur on a quarterly basis in addition to any provisions that are

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¹ FASB and IASB, March 2009 meeting. Information for Observers. Project: Loan Loss Provisioning.

event driven.² The primary goal of dynamic provisioning is the incremental building of reserves during good economic times to be used to absorb losses experienced during economic downturns.

We begin this paper with a discussion of the current approach to loan loss reserves (LLR) in the United States. We argue that, to a social planner who cares both about avoiding bank failures and the efficiency of bank lending, the current accounting and regulatory approach for LLR may be suboptimal on both fronts. First, by taking provisions after the economic downturn has set in, a bank faces higher insolvency risk. When a banker or regulator determines that a bank has inadequate LLR, the bank will have to build the reserves in an unfavorable economic environment. Also, inadequate reserves imply that regulatory capital ratios have been overstated, placing the bank at a higher risk for resolution by the Federal Deposit Insurance Corporation (FDIC). Second, as most banks tend to increase LLR during the economic downturn, the current approach may be procyclical; that is, it may amplify the business cycle. We aim to highlight some of the potential inefficiencies under the incurred loss approach by contrasting it to dynamic provisioning. Dynamic provisioning was instituted in Spain in 2000 in response to some of the same problems we highlight in the United States. We present a conceptual framework to compare loan loss provisioning under the incurred loss framework and dynamic provisioning. Then we simulate dynamic provisioning with U.S. data to present an empirical comparison. In the remainder of this section, we offer a brief summary of our main arguments and the conclusions from the simulation exercise.

In accounting terms, the LLR account, also known as the allowance for loan and lease losses (ALLL), is a contra-asset account used to reduce the value of total loans and leases on a bank's balance sheet by the amount of losses that bank managers anticipate in the most likely future state of the world.³ LLR incorporate both statistical estimates and subjective assessments. Provisioning is the act of building the LLR account through a provision expense item on the income statement. While we present the intuition behind LLR in this section, the Appendix to the paper describes their important accounting features in basic terms.

Interest margin income from loans is a smooth flow whereas a loan default or impairment event causes a lumpy drop in the stock of bank assets. This introduces volatility to banks' balance sheets. By themselves, a large number

² Dynamic provisioning is also known as statistical provisioning and countercyclical provisioning.

³ See, for example, Ahmed, Takeda, and Thomas (1999). See Benston and Wall (2005) for a treatment of fair value accounting as it pertains to loan losses. The key to Benston and Wall's arguments is that if loans could be reported reliably at fair value, where fair value is value in use, there would be no need for a loan loss provision or reserves. But a market for the full transfer of credit risk does not exist and loans cannot be reported reliably at fair value.

of loans may be insufficient to smooth these fluctuations out due to the correlation between the risks in the portfolio of bank loans. Some defaults are to be expected in a typical portfolio of bank loans. In order to avoid excess volatility of bank capital levels, banks can build a buffer stock of reserves against expected losses. Intuitively, LLR should serve to absorb expected loan losses while bank capital serves to absorb unexpected losses.⁴ The key difference between a conventional economic definition of expected losses and incurred losses is that, unlike expected losses, incurred losses cannot incorporate information from expected future changes into economic variables that affect credit defaults. Incurred losses are entirely based on historical information.⁵ If expected losses are greater than the loan loss reserve, regulatory capital ratios overstate the bank capital available to protect against insolvency risk.

To understand the argument that current loan loss accounting standards may have procyclical effects, we have to think about the LLR through the economic cycle. U.S. banking data show that LLR tend to be much lower during good economic times relative to bad economic times. An event-driven approach to LLR does not account for a booming economy resulting in banks relaxing their underwriting standards and taking greater risks.⁶ Most bad loans will only reveal themselves in a recession. In that sense, the current approach may magnify the economic boom. By delaying provisioning for loan losses until the economic downturn has set in, the current approach may also magnify the bust. Reserves have to be built at a time when bank funds are otherwise strained, potentially furthering the credit crunch.⁷ Therefore, even though banks should want to build “excess” LLR voluntarily during the boom years (it is efficient to do so from their perspective and it would have the benefit of offsetting cyclicity), the accounting guidelines pose a constraint.

⁴ See Laeven and Majnoni (2003, Appendix A) for a detailed description of the conceptual relationship between LLR, provisions, capital, and earnings.

⁵ Typically, expected loss is the mean of a loss distribution measured over a one-year horizon (expected loss is loss given default times the probability of default times the exposure at default); see Davis and Williams (2004). One way to separate the two concepts is by stating that no expected economic impacts are taken into account in LLR methodology. A bank manager cannot, for example, consider the increases in default risk due to future increases in unemployment.

⁶ Independently of any LLR effects, stylized facts and a burgeoning literature suggest that bank lending behavior is procyclical. Many explanations have been presented. The classical principal-agent problem between shareholders and managers may lead to procyclical banking if managers' objectives are related to credit growth. Two of the more recent theories are “herd behavior” and “institutional memory hypothesis.” Rajan (1994) suggests that credit mistakes are judged more leniently if they are common to the whole industry (herd behavior). Berger and Udell (2003) suggest that, as the time between the current period and the last crisis increases, experienced loan officers retire or genuinely forget about the lending errors of the last crisis and become more likely to make “bad” loans (the institutional memory hypothesis). Our argument here is that LLR effects may add to this otherwise present procyclicality of bank lending.

⁷ See Hancock and Wilcox (1998) and the sources cited therein for a discussion of the literature on the credit crunch. Also see Eisenbeis (1998) for a critique of Hancock and Wilcox (1998).

“Excess” reserves are associated with managing earnings, which is viewed as undesirable by the accounting profession. Wall and Koch (2000) offer a review of the theoretical and empirical evidence on earnings management via loan loss accounting. The evidence they summarize suggests that banks both have an incentive to and, in general, are using loan loss accounting to manage reported earnings. From the perspective of the accounting profession, using LLR to manage reported earnings is in conflict with the goals of transparency of a bank’s balance sheet as of the date of the financial statement. We take it as a given that the goals and concerns of the accounting standard setters are valid. We simply highlight the resulting tradeoffs.

We illustrate the tradeoffs by pointing to an alternative system of reserving for loan losses—dynamic provisioning. Dynamic provisioning is, at its core, a deliberate method to build LLR in good economic times to absorb loan losses during an economic downturn, without putting undue pressure on earnings and capital. Spanish regulators instituted dynamic provisioning in 2000 explicitly to combat their banking system’s procyclicality.⁸ In maintaining a focus on the use of historical data in its approach to loan loss provisioning, the Bank of Spain (the regulator of Spanish banks) has been able to adopt dynamic provisioning in compliance with IASB standards. We describe the Spanish method in some detail and present data on Spanish reserves (relative to contemporaneous credit quality) against the United States and other Western European economies in 2006, before the beginning of the crisis. According to these data, the Spanish policy was effective in building relatively higher reserves and thus worthy of further study.

We compare the incurred loss and dynamic provisioning approaches. Through a basic example we illustrate that the key difference is not the level of provisioning but the timing of the provisioning. By taking provisions early when economic conditions are good, banks will avoid using capital in an economic downturn when it is more expensive, thereby reducing the probability of failure from capital deficiencies. Moreover, a goal of dynamic provisioning is to ensure that the balance sheet accurately reflects the true value of assets to banks. If income is not reduced to provision for assets that are not collectable, then managers may be pressured to provide greater dividends to investors based on the income that is reported in the period.

As a next step in our analysis, we conduct an empirical simulation to illustrate that a dynamic provisioning framework (akin to the one implemented in Spain) could have allowed for a build-up of reserves during the boom years in the United States. The results demonstrate that the alternate framework would have smoothed bank income through the cycle and provisioning levels

⁸ In the current provisioning system, outside of Spain, loan loss provisions are generally countercyclical but their effect is thought to be procyclical. We refer to “procyclicality” as the amplification of otherwise normal business fluctuations.

would have been significantly lower during the financial crisis of 2007–2009. Note that, in contrast to accountants, bank regulators would not take issue with LLR resulting in income smoothing because the regulators' primary concern is the adequacy of the reserves to sustain loan losses.

The remainder of the article proceeds as follows. Section 1 describes current rules for LLR in the United States, as well as the issues confronting the current system, particularly as identified during the financial crisis of 2007–2009. Section 2 provides a conceptual framework for comparing the incurred loss and the dynamic provisioning approaches to LLR. Section 3 describes the approach as implemented by the Bank of Spain. Section 4 builds a simulation of dynamic provisioning with historical U.S. data. Section 5 concludes.

1. THE CURRENT ACCOUNTING AND REGULATORY FRAMEWORK FOR LOAN LOSS PROVISIONING IN THE UNITED STATES

Bank regulators view adequate LLR as a “safety and soundness” issue because a deficit in LLR implies that a bank's capital ratios overstate its ability to absorb unexpected losses. As a result of their important relationship to bank capital and financial reporting transparency, rules governing LLR have been revisited many times by bank regulators and accounting standard setters. Two crucial revision points relate to the new regulatory capital rules in the Basel Capital Accord (signed in 1988) as enacted by the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA)⁹ and the landmark case of the SunTrust Bank earnings restatement that occurred in 1998.¹⁰ Changes in capital rules may have reduced bank manager incentives to keep large reserve buffers, while the implementation of accounting rules following the SunTrust case may have made it more difficult to justify building a reserve buffer during good economic times. This section documents current rules that govern LLR, the U.S. data from the last three cycles, and the importance of LLR both for bank solvency and the procyclicality of bank lending.

Incurred Loss Accounting

Provisioning for loan losses in the United States is accounted for under Financial Accounting Standard (FAS) Statement 5, Accounting for Contingencies, and FAS 114, Accounting by Creditors for Impairment of a Loan—an amendment of FAS Statements 5 and 15. Impaired loans evaluated under FAS 114,

⁹ See Walter (1991) for extensive coverage of LLR leading to the 1991 changes. Ahmed, Taekda, and Thomas (1999) study how FDICIA (1991) changes affected the relationship between loan loss provisioning, capital, and earnings.

¹⁰ See Wall and Koch (2000) for an extensive summary of the theoretical and empirical evidence on bank loan loss accounting and LLR philosophies.

which provides guidance on estimating losses on loans individually evaluated, must be valued based on the present value of cash flows discounted at the loan's effective interest rate, the loan's observable market price, or the fair value of the loan's collateral if it is collateral-dependent.¹¹ Loans individually evaluated under FAS 114 that are not found to be impaired are transferred to homogenous groups of loans that share common risk characteristics, which are evaluated under FAS 5. FAS 5 provides for accrual of losses by a charge to the income statement based on estimated losses if two conditions are met: (1) information available prior to the issuance of the financial statements indicates that it is probable that an asset has been impaired or a liability has been incurred at the date of the financial statement, and (2) the amount of the loss can be reasonably estimated.¹²

Both FAS 114 and 5 allow banks to include environmental or qualitative factors in consideration of loan impairment analysis. Examples of these factors include, but are not limited to, underwriting standards, credit concentration, staff experience, local and national economic trends, and business conditions. In addition, FAS 5 allows for the use of loss history in impairment analysis.¹³ These elements provide bankers with flexibility in determining the level of provisions taken against incurred losses when they are well substantiated by relevant data and/or documentation required by supervisors and accountants. This paper includes illustrative examples to support our explanation of the technical aspects of accounting for loan losses. For consistency, when we refer to identified loan losses, we mean the accounting conditions for taking a provision were met. In practice, banks identify losses by categorizing loans based on their payment status (i.e., current, 30 days past due, 60 days past due, etc.) and the severity of delinquency (which can vary by asset class) and assess whether a provision should be taken on loans they expect to experience a loss, if the loss is probable and estimable.¹⁴

The U. S. Data

The adequacy of LLR to cover loan losses is generally measured against the level of non-performing loans (the ratio of the two is known as the coverage ratio), meaning loans that are seriously delinquent by being 90 or more days past due or in non-accrual status. Figure 1 shows LLR and non-performing

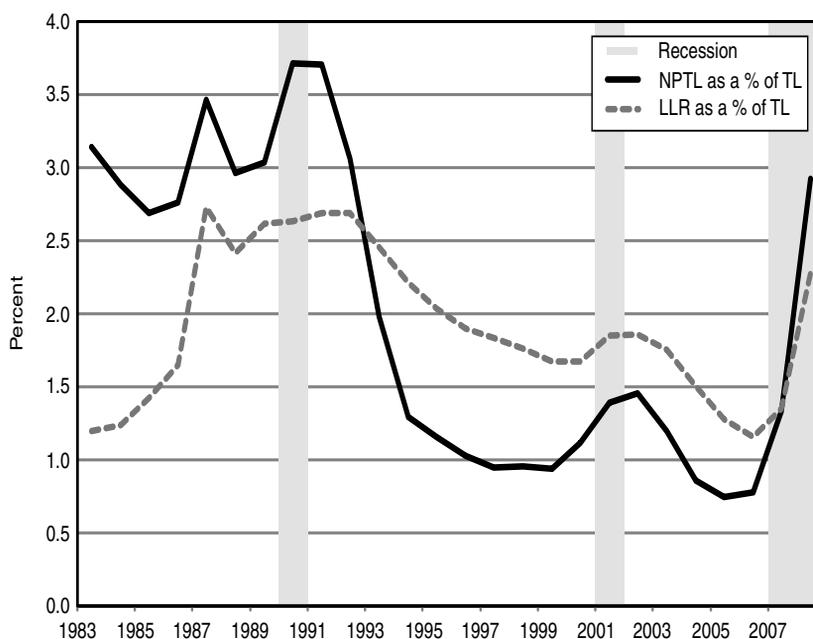
¹¹ Financial Accounting Standards Board, Summary of Statement No. 114: Accounting by Creditors for Impairment of a Loan—An amendment of FASB Statements No. 5 and 15 (Issued 5/93).

¹² Financial Accounting Standards Board, Summary of Statement No. 5: Accounting for Contingencies (Issued 3/75).

¹³ SR 06-17: Interagency Policy Statement on the ALLL, December 13, 2006. SR 01-17: Policy Statement on ALLL Methodologies and Documentation for Banks and Savings Institutions, July 2, 2001. SR 99-22: Joint Interagency Letter on the Loan Loss Allowance, July 26, 1999 IPS.

¹⁴ See Walter (1991) for an explanation of how banks identify and categorize defaults.

Figure 1 Loan Loss Reserves Versus Non-Performing Loans Ratios: U.S. Bank Aggregates in Levels, 1983–2008



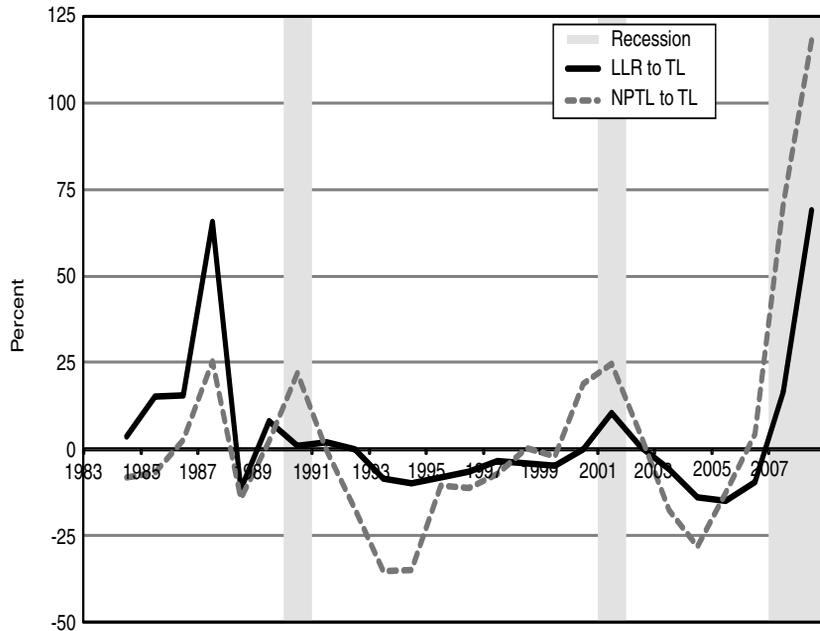
Notes: LLR = loan loss reserves; NPTL = non-performing total loans; TL = total loans.

Source: Call Reports.

loans, both scaled by total loans, between 1983 and 2008. The data come from the Commercial Bank Consolidated Reports of Condition and Income Reports (Call Reports) and they are constructed by combining all U.S. banks into an “aggregate” balance sheet. We show the aggregate level of reserves in the U.S. banking system at any point in time, the aggregate level of non-performing loans, and so on.

Figure 1 depicts the cyclicity of LLR. The first cycle is different from the subsequent two. Reserves are lower than non-performing loans during the banking crisis of the late 1980s and early 1990s. Because of the major regulatory changes that took full effect in 1992, we look more closely at the last two cycles. At the height of the boom, in 2005, we saw some of the lowest reserves relative to total loans on record. Note that this is not surprising given that non-performing loans and reserves move together. At any point between 1992 and 2006, there were more reserves in the system than there were non-performing loans. In 2005, banks had historically high coverage ratios, not

**Figure 2 Loan Loss Reserves Versus Non-Performing Loans Ratios:
U. S. Bank Aggregates Year Over Year Percentage Change,
1983–2008**



Notes: LLR = loan loss reserves; NPTL = non-performing total loans; TL = total loans.

Source: Call Reports.

because reserves were high (indeed they were at a historical low), but because non-performing loans were so low. The period 2006–2008 demonstrated how reserves needed to be built in an economic downturn to keep pace with the rapid deterioration in credit quality. Like credit problems, reserves grow just ahead of a recession and continue to grow after the recession has ended. In the first quarter of 2006, overall U.S. reserves were 1.1 percent of total loans. In the first quarter of 2009, they were built up to 2.7 percent of total loans.

Trends in reserve adjustments against changes in non-performing loans, shown in Figure 2, illustrate that modifications to LLR tend to lag credit problems, and reserves increase more slowly than non-performing loans during economic busts and fall more slowly in booms. Both Figures 1 and 2 indicate that some build-up of reserves relative to non-performing loans existed in the

U.S. banking system but the cushion shrank in the 2000s boom relative to the 1990s boom.¹⁵

Loan Loss Provisioning and Bank Solvency

The Basel Accord set current rules for LLR that prescribe the use of impairment and estimated loss methodology.¹⁶ FDICIA enacted these changes into law. LLR were no longer counted as a component of Tier 1 capital but were counted toward Tier 2 capital, up to 1.25 percent of the bank's risk-weighted assets. Laeven and Majnoni (2003) have argued that "... from the perspective of compliance with regulatory capital requirements, it became much more effective for U.S. banks to allocate income to retained earnings (entirely included in Tier 1 capital) than to loan loss reserves (only partially included in Tier 2 capital)" (Laeven and Majnoni 2003, 194).

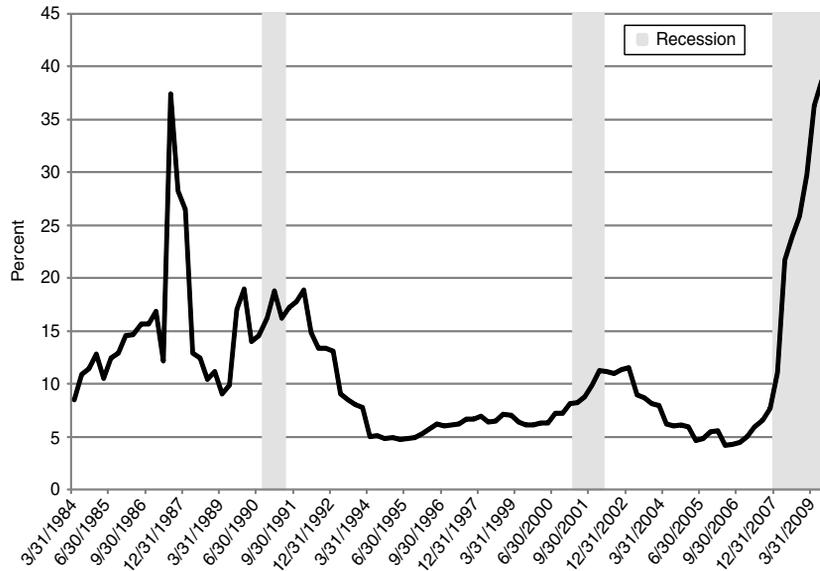
In the new regulatory regime of Basel I, banking regulators remained concerned with the roles that the loan losses and banks' reserve for losses play in insolvency risk. Comptroller of the Currency John Dugan, the regulator of U.S. national banks, has stated that "... banking supervisors love the loan loss reserve. When used as intended, it allows banks to recognize an estimated loss on a loan or portfolio of loans when the loss becomes likely, well before the amount of the loss can be determined with precision and is actually charged off. That means banks can be realistic about recognizing and dealing with credit problems early, when times are good, by building up a large 'war chest' of loan loss reserves. Later, when the loan losses crystallize, the fortified reserve can absorb the losses without impairing capital, keeping the bank safe, sound, and able to continue extending credit" (Dugan 2009). But accounting guidelines, as enforced in the late 1990s and 2000s, may have limited the ability of LLR to function in the way summarized by Comptroller Dugan.

In the mid-1990s, the Securities and Exchange Commission (SEC) was increasingly concerned that U.S. banks may be overstating their LLR, potentially using this account to manage reported earnings. In 1998, following an SEC inquiry, SunTrust Bank agreed to restate prior years' financial statements, reducing its provisions in each of the years 1994–1996 and resulting in a cumulative reduction of \$100 million to its LLR (see Wall and Koch 2000). Analysts of the U.S. banking industry viewed the SunTrust restatement as a permanent strengthening of the existing accounting constraint on a bank's LLR policy.

¹⁵ Note that non-performing loans are only shown as a limited approximation of incurred losses. There is no regulatory guidance that advocates a 100 percent reserve coverage for non-performing loans. Nonetheless, it is a helpful standard simplification to present the data in this way.

¹⁶ Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework—Comprehensive Version. <http://www.bis.org/publ/bcbs128.htm>.

Figure 3 Loan Loss Provisions as a Percentage of Net Operating Revenue: U.S. Bank Aggregates, 1984–2009



Source: Call Reports.

Bankers desire flexibility in recognition of the subjective aspects in determining appropriate reserves. Bank regulators desire flexibility in recognition of the importance of LLR for bank safety and soundness. Accounting standard setters stress the need for transparency and comparability across banks' financial statements. We take it as a given that the goals of the accounting standard setters and their concern over earnings management are valid. We simply highlight the resulting tradeoffs.

Figure 3 illustrates the importance of provision expense relative to bank income. First, the size of provisions relative to earnings helps us understand their importance to bank managers, accountants, and bank regulators. Second, the period 2007–2009 illustrates nicely the inverse relationship between earnings and provisions in a recession. Banks had to sharply increase provisions in recognition of pending losses, which for many banks more than offset earnings and reduced capital.

Loan Loss Provisioning and Procyclicality

By entering the current economic downturn with low LLR, the banking sector may have unintentionally exacerbated the cycle. In a speech in March 2009, Ben Bernanke, the Chairman of the Board of Governors of the Federal Reserve stated that there is “considerable uncertainty regarding the appropriate levels of loan loss reserves over the cycle. As a result, further review of accounting standards governing . . . loan loss provisioning would be useful, and might result in modifications to the accounting rules that reduce their procyclical effects without compromising the goals of disclosure and transparency” (Bernanke 2009).

The cyclicity of loan loss provisioning is well documented with cross-country data. During periods of economic expansion, provisions fall (as a percentage of loans) and, conversely, they rise during downturns. Figure 1 illustrated the cyclicity of loan loss provisioning with U.S. data. As with bank regulatory capital, the concern is that with an approach in which banks have to rapidly raise reserves during bad times, the bad times could get prolonged.¹⁷ Laeven and Majnoni (2003) and Bouvatier and Lepetit (2008) document the procyclicality of loan loss provisions with cross-country data. Banks delay provisioning for bad loans until economic downturns have already begun, amplifying the impact of the economic cycle on banks’ income and capital.

Section 1 documented the current framework around LLR in the United States, the U.S. data from the last three cycles, and the importance of LLR both for bank solvency and the procyclicality of bank lending. In response to the recent experience where many banks had to increase their LLR abruptly and drastically, various U.S. and international regulators have expressed the desire to revisit LLR policies. The Financial Stability Forum’s Working Group on Provisioning (2009) has recommended that accounting standard setters give due consideration to alternative approaches to recognizing and measuring loan losses. One approach that has garnered attention is dynamic provisioning.

2. INCURRED LOSS ACCOUNTING VERSUS DYNAMIC PROVISIONING: A CONCEPTUAL FRAMEWORK

In this section, we discuss and compare dynamic provisioning with the incurred loss methodology using two simplified examples that will set the stage for a more complicated simulation completed in a subsequent section. And, while

¹⁷ For simplicity, we are not addressing in this article all the links between LLR and regulatory capital, nor the similarities between the cyclical effects of LLR and regulatory bank capital. On the latter, we refer the reader to a large literature ranging from Bernanke and Lown (1991) to Peek and Rosengren (1995) to Pennacchi (2005), who use U.S. data to analyze the effects of capital requirements on banks and the economy.

we will review at a high level the technical nuances of accounting, a more detailed discussion of accounting basics is included in the Appendix.

The IASB and the British Bankers Association (BBA) provide more flexibility than the FASB for firms to include forward-looking elements based on expectations of total losses over the life of loans, rather than losses already realized, but are still similar to the U.S. standards. The BBA Statement of Recommended Practice on advances indicates specific provisions should be made to cover the difference between the carrying value and the ultimate realizable value, made when a firm determines that information suggests impairment. General provisions¹⁸ take into account past experience and assumptions about economic conditions, but are generally small because the Basel Accord of 1988 limits general provisions to 1.25 percent of risk-weighted assets and such provisions are not tax deductible (Mann and Michael 2002).

The IASB, in standard 39, requires assessment at each balance sheet date to determine whether there is objective evidence that an asset or group of assets is impaired—the difference between the asset’s carrying amount and the present value of estimated cash flows discounted at the original interest rate—based on criteria such as the financial condition of the issuer, breach of contract, probability of bankruptcy, and historical pattern of collections of accounts receivable.¹⁹

The incurred loss model for accounting for loan losses is divorced from prudential goals of maintaining the safety and soundness of financial institutions in that the FASB and IASB frameworks do not aim to influence the decisions investors make toward a specific objective, such as financial stability.²⁰ Instead, the goal of financial reporting is to provide financial statement users with the most accurate information about identified losses in the loans and leases portfolio. The dynamic provisioning model, conversely, has as its primary objective the enhancement of the safety and soundness of banks. Its fundamental premise is that when loans are made the probability that default will occur on a loan is greater than zero. In accordance with this philosophy, the dynamic provisioning approach provides a model-based mechanism for a bank to build a stock of provisions in good times so it will not face insolvency due to charge-offs and provisions in bad times. In a simple exercise, presented in Tables 1 and 2, we demonstrate how the application of the incurred loss model would differ from that of dynamic provisioning.²¹

We will make a number of simplifications to help facilitate an understanding of this topic. These assumptions, if not applied, wouldn’t substantively

¹⁸ The Bank of Spain refers to statistical provisions as general provisions. See Saurina (2009a).

¹⁹ Deloitte: Summaries of International Financial Reporting Standards. <http://www.iasplus.com/standard/ias39.htm>.

²⁰ The Financial Crisis Advisory Group. Public Advisory Meeting Agenda, February 13, 2009.

²¹ The illustration builds on an example provided by Mann and Michael (2002).

Table 1 Incurred Loss Model

Assets	Year 1	Year 2	Year 3	Year 4	Year 5
Total Loans and Leases	1,000	1,000	1,000	1,000	1,000
Expected Losses	40	40	70	100	100
Stock of Specific Provisions	0	0	30	100	100
Yearly Charge-offs	0	0	5	60	35
Total Charge-offs	0	0	5	65	100
Total Stock of Provisions Net of Stock of Charge-offs	0	0	25	35	0
Loans Net of Charge-offs	1,000	1,000	995	935	900
Income Statement					
Profit before Provision	30	30	30	30	30
Specific Provision	0	0	30	70	0
Profit after Provision	30	30	0	-40	30
Shareholders' Equity					
Shareholders Equity, Beginning	44	50	56	56	16
Other Expenses and Dividends	24	24	0	0	24
Retained Earnings	6	6	0	-40	6
Shareholders' Equity, End	50	56	56	16	22
Equity to Assets	5.00%	5.60%	5.63%	1.71%	2.44%
Solvency: Equity to Assets $\geq 2\%$	Solvent	Solvent	Solvent	Insolvent	Solvent

Notes: Expected losses represent bank managers' expectations for losses over the five-year period in the listed year. Specific provisions are those identified as probable and estimable. Yearly charge-offs are those taken in the listed year, while the total is the sum of charge-offs over the five-year period. Equity to assets is shareholders' equity, end divided by loans net of charge-offs.

change the results of our example, but instead, on average, only reinforce our conclusions. First, the example bank in question will make all its loans in Year 1 and will not grow its portfolio. This prevents us from having to account for changes in bank managers' preference for varying risks of loans over time as the economic environment changes. Second, we assume that, over the five-year cycle, the bank's pre-provision profits don't vary. If we introduced profit declines as conditions worsened, which would likely occur since the bank's net interest margin (its only source of income in the example) would decline due to charge-offs, the result would be reduced pre-provision profits and the reduction of profit due to provisions would be greater. Third, we assume we know the ex post level of risk in the portfolio of loans. In our example, losses at the end of the five-year cycle will equal 10 percent of the loan portfolio. For illustrative purposes we make the assumption that bank managers believe, based on the bank's historical loss experience, total ex post losses will equal 4 percent in Year 1 when loans are issued. As a loan approaches maturity in Year 5, managers can, with greater certainty, estimate the true extent of ex

Table 2 Dynamic Provisioning Model

Assets	Year 1	Year 2	Year 3	Year 4	Year 5
Total Loans and Leases	1,000	1,000	1,000	1,000	1,000
Expected Losses	40	40	70	100	100
Stock of Specific Provisions	0	0	30	100	100
Stock of Statistical Provisions	20	40	40	0	0
Total Stock of Provisions	20	40	70	100	100
Yearly Charge-offs	0	0	5	60	35
Total Charge-offs	0	0	5	65	100
Total Stock of Provisions Net of Stock of Charge-offs	0	0	65	35	0
Loans Net of Charge-offs	1,000	1,000	995	935	900
Income Statement					
Profit before Provision	30	30	30	30	30
Provisions	20	20	30	30	0
Profit after Provision	10	10	0	0	30
Shareholders' Equity					
Shareholders' Equity, Beginning	44	46	48	48	48
Other Expenses and Dividends	8	8	0	0	24
Retained Earnings	2	2	0	0	6
Shareholders' Equity, End	46	48	48	48	54
Equity to Assets					
Solvency: Equity to Assets \geq 2%	4.60% Solvent	4.80% Solvent	4.82% Solvent	5.13% Solvent	6.00% Solvent

Notes: Expected losses represent bank managers' expectations for losses over the five-year period in the listed year. Specific provisions are those identified as probable and estimable. Statistical provisions are those taken under the dynamic provisioning model based on the historical data used to estimate the annual statistical provision. Yearly charge-offs are those taken in the listed year, while the total is the sum of charge-offs over the five-year period. Equity to assets is shareholders' equity, end divided by loans net of charge-offs.

post losses. To show how provisioning levels are determined over time, we allowed managers' expectations about expected losses to change in each year to justify provisions each period (the expected losses entry in Tables 1 and 2). Lastly, since the primary intent of dynamic provisioning is to better prepare financial institutions to absorb loan losses, we make assumptions about shareholders' equity. First, we assume shareholders' equity is all tangible equity and total loans and leases equal total assets. Accordingly, shareholders' equity is determined by adding retained earnings, after dividends and expenses, to shareholders' equity. To determine yearly retained earnings we assume a constant ratio of dividend and other expenses equal to 80 percent of after-provision profit. Under current prompt corrective action (PCA) standards used by banking regulators, the Tier I capital ratio, total capital ratio, and leverage ratio are used to determine when banks need to be resolved by the FDIC. In this

Table 3 Capital Guidelines

	Leverage Ratio
Well Capitalized	5 percent
Adequately Capitalized	4 percent
Undercapitalized	< 4 percent
Significantly Undercapitalized	< 3 percent
Critically Undercapitalized	< 2 percent

example, since shareholders' equity most closely resembles tangible equity, we will focus on the leverage ratio, which in the example is equal to equity divided by assets, as the primary measure of solvency. In Year 1 we assume the bank starts with \$44 shareholders' equity and \$1,000 total assets, leaving it adequately capitalized at 4.4 percent. The PCA guidelines listed in Table 3 apply to the leverage ratio.

We begin our discussion with the incurred loss model. As previously mentioned, bank managers expect that, given the average risk and performance of loans and leases issued, the banks' total losses will amount to 4 percent of the face value of loans at the end of Year 5; this is reflected in Year 1, the first column in Tables 1 and 2, listed in the row entitled Expected Losses. However, since data do not exist that support identification of losses—evidence suggesting the 4 percent of losses is probable and estimable—bank managers cannot take provisions until such data exist. In Year 3, the first losses of \$30 are identified in the portfolio and managers' expectation about total losses increases to 7 percent (or \$70) based on new data. However, since only \$30 in losses have been identified, only a provision of that amount can be taken. Additionally, since the \$30 pre-provision profit was wiped out by the provision, the bank's managers can't modify other expenses and dividends to increase capital to prepare for the increase in losses. In Year 4, charge-offs increase to \$60 for the year and bank managers believe losses will amount to \$100, or 10 percent of loans and leases. The bank's profit of \$30 is eliminated by a provision of \$70 required by accountants, and a net loss of \$40 (shown as negative retained earnings in Table 1) requires the bank to reduce its capital by that amount. When a net loss occurs, banks must use capital to equate assets with liabilities and shareholders' equity on the balance sheet. The reduction in capital leaves the bank with only \$16, resulting in a leverage ratio of 1.71 percent. By PCA standards, this leaves the bank critically undercapitalized and it will be resolved by banking regulators.

Table 2 presents the example bank under dynamic provisioning. Under the dynamic provisioning model, bank managers would take a different approach to provision for loan losses focusing on incrementally building up a fund (referred to as the statistical fund) to protect the bank against losses expected but not yet identified in the loans and leases portfolio. The model driving

the building process for the statistical fund would rely on historical default data for the types of loans and leases issued by the bank rather than models estimating expected losses; this is an important distinction between the dynamic provisioning approach and a strict expected loss approach. In Year 1, when loans and leases of \$1,000 were made, bank managers expected a total of 4 percent of the loans and leases portfolio to default based on its historical data, as reflected in the stock of statistical provisions built. Accordingly, the managers establish a plan to build a fund for the bank to absorb those losses over a two-year period. In Years 1 and 2 the bank provisions \$20 to reach the \$40 fund desired. This has the effect of reducing profits in those years to \$10 instead of \$30, which in turn reduces the amount of other expenses and dividends the bank's managers have and the amount of retained earnings available to build capital. However, since the fund is capital set aside to absorb losses the bank is anticipating based on historical data, the Year 2 capital ratio including the fund is 8.8 percent, compared to 5.6 percent under the incurred loss model in the same year. In Year 3, charge-offs increase to 0.5 percent and the bank's managers modify their expectation of total losses expected on the loans and leases portfolio to 7.0 percent.

As with the incurred loss model, the \$30 identified in specific provisions would also be taken under the dynamic provisioning model. Bank managers, in segmenting specific from statistical provisions, are not only preparing for losses they expect to incur at some point over the life of the loan, but they are also signaling to users of financial statements the difference between the expectation for losses as suggested by the historical data on defaults for the assets held and those actually identified in the portfolio as probable and estimable. The combined fund of \$40 and the specific provision of \$30 allow the bank to have total provisions equal to \$70, preparing the bank to fully absorb the expected losses. And while this reduces profit to \$0, the bank's solvency is well protected. In Year 4, charge-offs increase sharply to \$60 and the bank's managers expect losses to increase to \$100. Bank managers shift the \$40 statistical fund to specific provisions and add \$30. After annual charge-offs of \$60, the bank has \$35 remaining at the end of Year 4 in its stock of provisions to absorb the remaining \$35 in identified losses. Again, the bank's provisioning reduces its profit to \$0, but in a difficult economic environment when bank losses are sharply increasing, dividends are being halted throughout the industry and the bank's managers are actively attempting to reduce expenses, the primary concern is solvency. The bank under the incurred loss model becomes insolvent in Year 4, while the bank under the dynamic provisioning model is actually able to increase its leverage ratio, although due to a reduction in balance sheet assets from charge-offs. In Year 5, under the assumption of no recoveries, the remaining charge-offs of \$35 occur and the stock of provisions is depleted. The remaining loans and leases are paid down and the bank's leverage ratio increases again.

This basic example illustrates one of the primary points of importance for dynamic provisioning: the key difference is not the level of provisioning but the timing of the provisioning. By taking provisions early when economic conditions are good, banks may be able to avoid using their capital in an economic downturn when it is more expensive, thereby reducing the probability of failure from capital deficiencies. Moreover, an objective of dynamic provisioning is to ensure that the balance sheet accurately reflects the true value of assets to banks. If income is not reduced to provision for assets that are not collectable, then managers may be pressured to provide greater dividends to investors based on the income that is reported in the period.

3. DYNAMIC PROVISIONING AND THE SPANISH EXPERIENCE

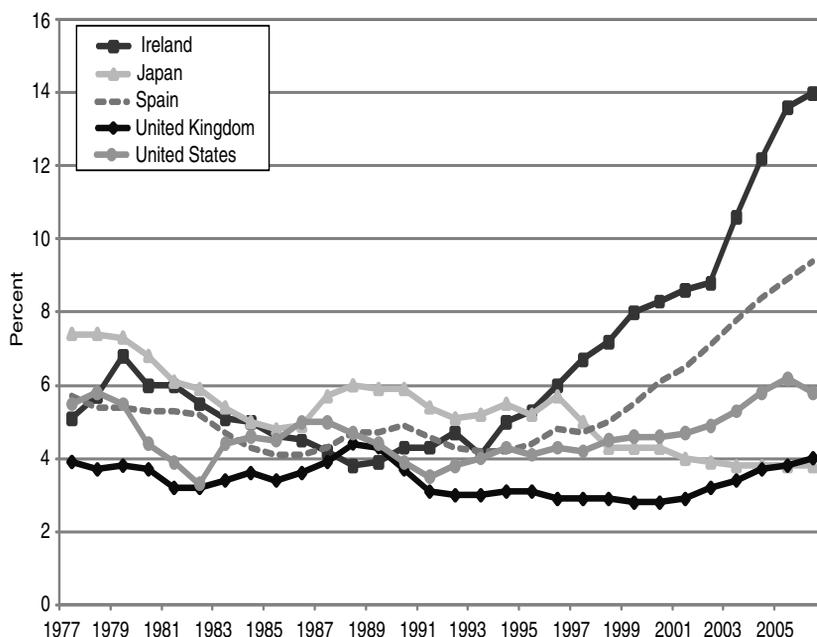
In the wake of the financial crisis of 2007–2009, as various banking policymakers revisit loan loss provisioning rules, there have been calls to study the Spanish experience. The Spanish provisioning system has been credited by most market observers as positioning its banks to avoid the strain that their international peers experienced in 2007. This section reviews the historical developments that led to Spain's adoption of dynamic provisioning. Subsequently, we provide methodological details of the original dynamic provisioning approach implemented in 2000 and the modifications made in 2004. Lastly, we briefly discuss the position of Spanish banks at the end of 2006, just prior to the onset of the financial crisis, which will allow readers to gauge the efficacy of the policy; 2006 is the year of emphasis for our analysis because the primary intent of dynamic provisioning is to prepare banks to absorb losses, which, if effective, should have been accomplished by year's end in 2006.

Why is Spain a Relevant Example?

Spain makes for an interesting case in reference to an international financial crisis precipitated by a widespread housing boom.²² Spain's housing sector boom greatly outpaced the United States', Japan's, and the United Kingdom's, as seen in Figure 4. Spanish loan loss provisions historically demonstrated high procyclicality with the business cycle. From 1991–1999, Spain's correlation between loan loss provisioning levels and GDP was -0.97 , the highest in the Organisation for Economic Co-operation and Development (OECD). Similarly, in 1999, Spain had the lowest level of loan loss provisions (to total loans) of any OECD country (Saurina 2009a). In response to pronounced procyclicality, the Bank of Spain in 2000 implemented a countercyclical

²² For a discussion of the housing boom in Spain, see Garcia-Herrero and Fernández de Lis (2008).

Figure 4 Gross Fixed Capital Formation in Housing as a Percentage of GDP, 1977–2006



Source: OECD data.

method of loan loss provisioning that allowed banks to build a reserve in good times to cover losses in bad times.^{23, 24}

The Original Model

In 1989, the Bank of Spain was authorized to establish the accounting practices of the banks it supervises, helping to resolve the conflict between the objectives of accountants and regulators over issues such as loan loss provisioning. The Bank of Spain has historically viewed loan loss provisioning as a necessary policy to accomplish its goals of prudential supervision. In a

²³ Subsequent to the Asian Financial Crisis, many emerging Asian economies instituted loan loss provisioning policies (some used discretionary measures) that increased provisioning in good times, leaving the banking system well prepared to absorb losses associated with an economic downturn. For a detailed description of these measures, see Angklomkiew, George, and Packer (2009).

²⁴ For a brief summary of the Spanish method, see Saurina (2009b).

Table 4 Risk Categories Under Standard Approach to Statistical Provisioning: The 2000 Methodology

Category	Description
Without Risk (0.0%)	Risks involving the public sector
Low Risk (0.1%)	Mortgages with outstanding risk below 80 percent of the property value, as well as risks with firms whose long-term debts are rated at least "A"
Medium-Low Risk (0.4%)	Financial leases and other collateralized risks (different from the former in point 2)
Medium Risk (0.6%)	Risks not mentioned in other points
Medium-High Risk (1.0%)	Personal credits to financial purchases of durable consumer goods
High Risk (1.5%)	Credit card balances, current account overdrafts, and credit account excesses

regulation adopted in 2000 upon a foundation set out in Circular 4/1991, the Bank of Spain instituted dynamic provisioning (Poveta 2000). The Bank of Spain places significant emphasis on the growth years in a credit cycle and, given the enhanced procyclicality recognized in Spain (see Fernández de Lis, Pagés, and Saurina 2000), the goal of statistical provisioning is to compensate for the underpricing of risk that takes place during those years. Statistical provisioning intends to anticipate the next economic cycle, although it is not meant to be a pure expected loss model because it is backward-looking (Fernández de Lis, Pagés, and Saurina 2000). The statistical fund, built by quarterly provisions recognized on the income statement, was meant to complement the insolvency fund, but, instead of covering incurred losses, was built from estimates of latent losses on homogenous asset groups.

The regulation established two methods for computing the quarterly statistical provision. Banks can create their own internal model using their own loss experience, provided that the data used spans at least one economic cycle and is verified by the bank supervisor. Conversely, banks can use the standard approach outlined by the Bank of Spain, based on a parameter measuring the risk of institutions' portfolio of loans and leases. For this analysis, our focus will be on the standard approach for two reasons. First, the majority of institutions in Spain use the standard method and, second, the internal models are not available publicly and therefore cannot be the subject of analysis.

The standard approach was developed on the assumption that asset risk is homogenous. The Bank of Spain, in adopting the statistical provision in July 2000, created six risk categories of coefficients by assets for banks to use to take a quarterly provision. The coefficients, shown in Table 4, are based on historical data of the average net specific provision over the period

1986–1998, meant to reflect one economic cycle in Spain.²⁵ Similar to loan loss provision methods under International Financial Reporting Standards (IFRS) and generally accepted accounting principles (GAAP), the statistical provision is recognized on the income statement and thus has the effect of reducing profits when the difference between the statistical and specific provision is positive. When the statistical provision is negative it reduces the statistical fund, which cannot be negative, and increases profits. The statistical provision is not a tax-deductible expense. To limit the size of the statistical fund, which is a function of the type of assets a bank holds and the duration of economic growth, the fund was capped at 300 percent of the coefficient times the exposure.

The Current Model

In 2004, the Bank of Spain made several modifications to its approach to the statistical provision to conform to the IFRS guidance adopted by the European Union, becoming compulsory for Spanish banks in 2005.²⁶ The following equation sets out the new approach:

$$\text{General provision}_t = \sum_{i=1}^6 \alpha_i \Delta C_{it} + \sum_{i=1}^6 \left(\beta_i - \frac{\text{Specific provision}_{it}}{C_{it}} \right) C_{it}.$$

The new model retains a general risk parameter, α , meant to capture the different risks across homogenous categories of assets. For each asset class, α is the average estimate of credit impairment in a cyclically neutral year; and, although it is meant to anticipate the next cycle, it is not intended to predict it. Two components of the α parameter—that it is backward-looking and unbiased (cyclically neutral)—are crucial in differentiating the policy from an expected loss approach, which would attempt to gauge the characteristics of the next economic cycle through forecasting methods or incorporating expectations about future economic performance. Rather, the use of cyclically unbiased historical data allows provisions to be taken based on the past experience of assets. This feature removes the potential for conflict between banking regulators and banks because there is no discretion over the expectations of

²⁵ Fernández de Lis, Pagés, and Saurina (2000) indicate that the data incorporate banks' credit risk measurement and management improvements without specifically providing details.

²⁶ The Spanish experience could be considered unique in that the central bank is also the accounting standard setter for banks. Safety and soundness prudential decisions are not made in an accounting vacuum as illustrated by the need for changes to the Spanish model in 2004. The ongoing debate in many countries sets those who argue that a countercyclical reserve account could be made transparent in financial reporting (and sophisticated investors would differentiate the statistical build-up) against the accounting standard setters' reluctance to turn bank financial reports into prudential regulatory reports. Any LLR reform would involve compromise between bank regulators and accounting standard setters.

Table 5 Risk Categories Under Standard Approach to Statistical Provisioning: The 2004 Methodology

Category	Description
Negligible Risk ($\alpha = 0\%$, $\beta = 0\%$)	Cash and public sector exposures (both loans and securities)
Low Risk ($\alpha = 0.6\%$, $\beta = 0.11\%$)	Mortgages with a loan-to-value ratio below 80 percent and exposure to corporations with a rating of "A" or higher
Medium-Low Risk ($\alpha = 1.5\%$, $\beta = 0.44\%$)	Mortgages with a loan-to-value ratio above 80 percent and other collateralized loans not previously mentioned
Medium Risk ($\alpha = 1.8\%$, $\beta = 0.65\%$)	Other loans, including corporate exposures that are non-rated or have a rating below "A" and exposures to small- and medium-size firms
Medium-High Risk ($\alpha = 2.0\%$, $\beta = 1.1\%$)	Consumer durables financing
High Risk ($\alpha = 2.5\%$, $\beta = 1.64\%$)	Credit card exposures and overdrafts

economic performance that may lead to over- or underprovisioning. It is also beneficial for investors because it provides transparency of provisioning.

In contrast to the original model, the 2004 approach includes a β parameter that interacts with the specific provision (see Table 5). β is the historical average specific provision for each of the homogenous groups. The interaction between β and the specific provision measures the speed with which non-specific provisions become specific for each asset class. C_{it} represents the stock of asset i at time t . The limit of the statistical fund was modified to 1.25 times latent exposure.²⁷

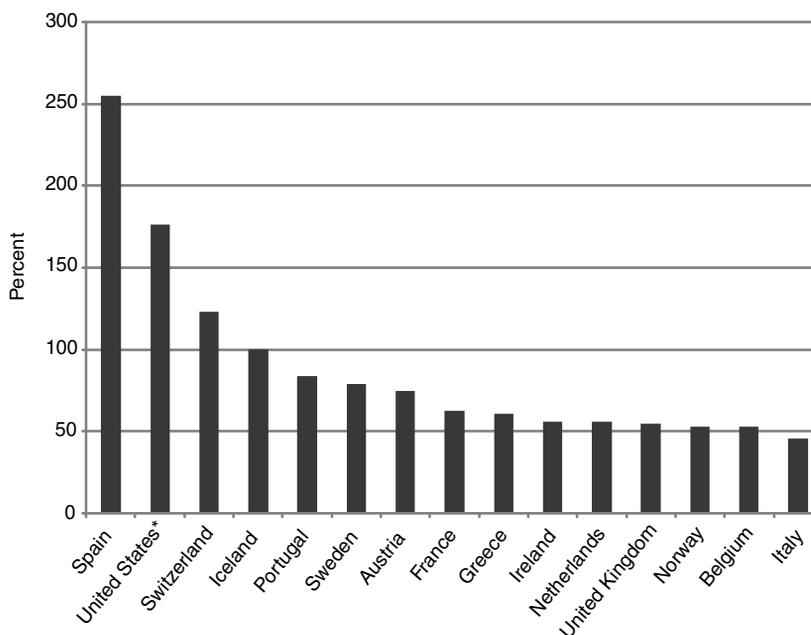
Spanish Banks in 2006

What difference did dynamic provisioning make for Spain?²⁸ In 2006, the Spanish banking system had by far the highest coverage ratio (the ability of the LLR to cover non-performing loans) among Western European countries at 255 percent. At the same time, the U.S. aggregate coverage ratio was 176 percent.²⁹ Figure 5 shows the coverage ratios for Spain and the United States and also Spain's European peers as of 2006. To reiterate, 2006 was important

²⁷ The Bank of Spain defines latent loss generally as the probability of default times loss given default. See Saurina (2009a).

²⁸ As part of the Financial Sector Assessment Program, the International Monetary Fund (2006) states that the Central Bank of Spain has pioneered a rigorous provisioning system that enhances the safety and soundness of Spanish banks. While we will briefly discuss the condition of Spanish banks in 2006, see Saurina (2009d) for a more detailed review.

²⁹ The data were obtained from Banco de España (2008), U.S. Call Reports, Saurina (2009c) and IMF cited in Catan and House (2008).

Figure 5 Loan Loss Reserves as a Percentage of Non-Performing Assets

Notes: *The coverage ratio for the United States is the aggregate LLR for all commercial banks as a percentage of the aggregate non-performing loans. It was computed using Call Report data. All other countries' data come from the International Monetary Fund.

for measurement purposes because the primary intent of dynamic provisioning is the timing of provisions. At the onset of the financial crisis and global recession, dynamic provisioning worked as expected in Spain, allowing large Spanish banks like Santander and BBVA to enter the crisis with substantial reserve cushions relative to non-Spanish peers. Many observers, including G20 Finance Ministers, have singled out the Spanish dynamic provisioning system as a contributor to that banking sector's soundness entering the financial crisis of 2007–2009. It is beyond the scope of this article to assess what, if any, fraction of banking sector stability in Spain is attributable to dynamic provisioning versus other Spain-specific factors. Additional factors unique to Spain may have a bearing were this policy to be adopted more widely.

4. DYNAMIC PROVISIONING: A SIMULATION WITH U. S. DATA

One way to illustrate potential inefficiencies of the current U.S. loan loss provisioning framework is to simulate U.S. bank loan loss provisioning over the last two business cycles under an alternate provisioning framework. This section illustrates that a dynamic provisioning framework (akin to that implemented in Spain) could have allowed for a build-up of reserves during the boom years. The results demonstrate that the alternate framework would have smoothed provisions and bank income through the cycle. The severe drop in bank income associated with the actual steep rise in loan loss provisioning during the financial crisis of 2007–2009 would have been substantially reduced. With positive net income in its place, banks could have increased their capital through internal means and thus reduced the need for assistance from the U.S. government. Note that no precise conclusions can be reached as to the magnitude of these effects from the exercise. Any conclusions based on the simulation are subject to the Lucas Critique in that a change in LLR methodology is likely to influence bank lending behavior (Lucas 1976). Lending and other related variables would therefore take on values different from those actually observed and used in the simulation. Nonetheless, the simulation is a useful illustration of the relationship between loan loss provisioning and bank income under the two different frameworks.

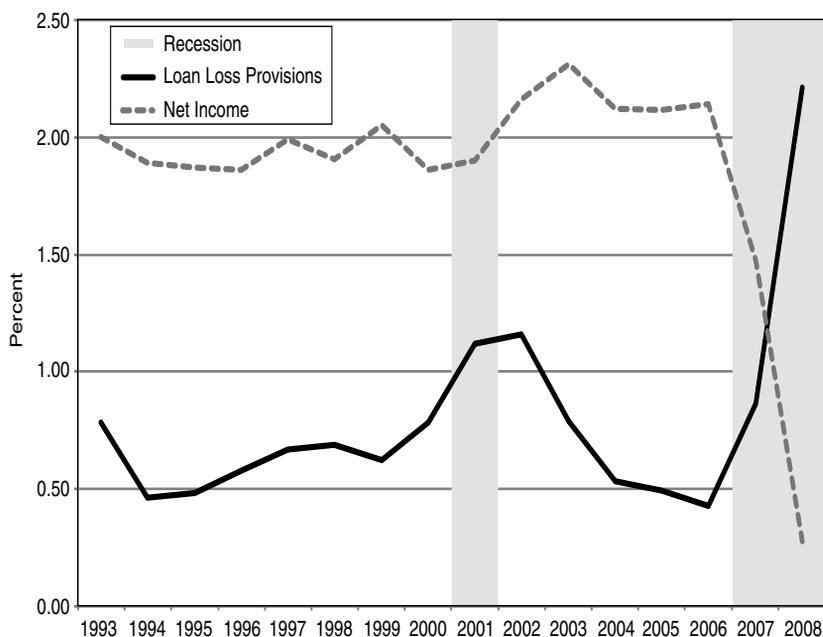
Using aggregate U.S. data from the year-end quarterly FDIC banking reports (key actual data presented in Figure 6),³⁰ we created an example bank. We have populated the example bank's financial report with aggregates from a hypothetically consolidated U.S. commercial banking industry so as to observe the interaction of a dynamic provisioning approach with historical U.S. banking data. We apply the 2004 Spanish provisioning methodology to the financials of the example bank so as to display and describe the technical nuances of dynamic provisioning. The purpose of this exercise is to demonstrate a well-functioning variant of the policy, that is, how the policy should work, not how it would or would have worked. Accordingly, several simplifying assumptions were required to complete the simulation.

First, we selected representative α and β parameters to compute the statistical provision on a yearly basis. We selected 1.8 percent and 0.65 percent, respectively. While an attempt could have been made to approximate the parameters for the example bank, the available banking data does not permit that level of analysis.³¹ Further, these parameters allowed us to show the results under a case where the policy is effective and, by examining the results under

³⁰ FDIC Quarterly Banking Profile: 1998–2008

³¹ The coefficients used in the Spanish standard approach are estimated from a large credit database maintained by the Bank of Spain. No equivalent consolidated credit database exists in the United States as of the publication of this article.

Figure 6 Aggregate U.S. Bank Loan Loss Provisions and Net Income as a Percentage of Total Loans, 1993–2008



Source: FDIC data.

this example, readers should be able to also grasp how the results would vary under the case where the parameters were either too high or low.

Second, we had to select a time period for illustrative purposes. The simulation for the example bank begins in 1993 with five years devoted to building the statistical fund. We targeted a build-up of about 2 percent of total loans by 1999 (close to the largest statistical fund possible of 1.25α). Subsequent to 1999, the statistical fund was built using only the statistical provision, shown in line 6 of Table 6 (all line references for the simulation are from Table 6). Line 13 is the actual allowance for loan and lease losses (ALLL),³² while line 14 is the ALLL plus the statistical fund, equal to the total stock of provisions. Line 16, the actual loan loss provision for the year divided by total loans and leases (LLP/TLL), and line 17, the five-year moving

³² ALLL is the formal accounting term for loan loss reserves.

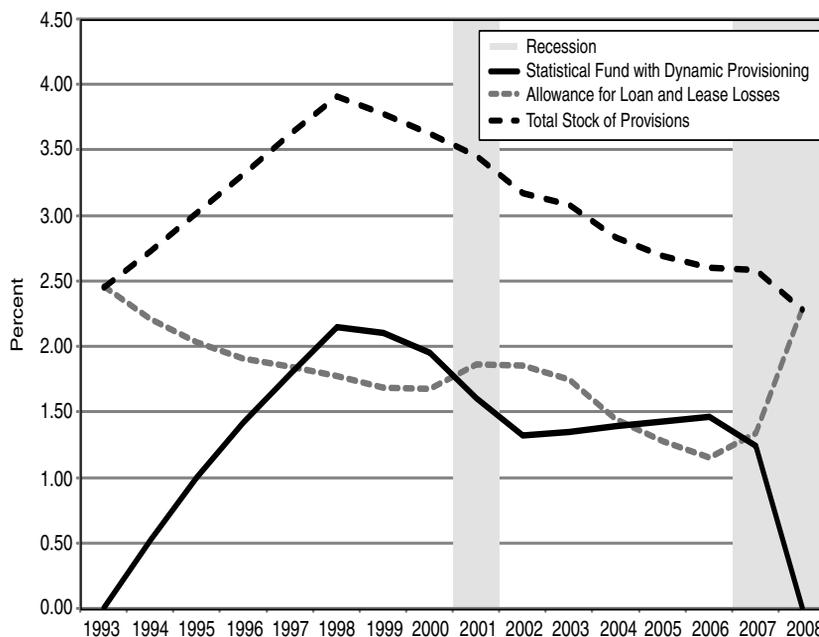
Table 6 Dynamic Provisioning Simulation: Example Bank, 1999–2008
(in millions, except TLL)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Balance Sheet Accounts										
1 TLL, in billions	3,491	3,820	3,889	4,156	4,429	4,904	5,380	5,981	6,626	6,840
2 Actual Rate of Growth	7.81%	9.40%	1.83%	6.86%	6.55%	10.74%	9.70%	11.17%	10.80%	3.22%
Parameter Scenarios										
3 $\alpha = 1.8\%$										
4 $\beta = 0.65\%$										
5 Statistical Fund, Beginning	69,395	73,238	74,494	62,229	54,873	59,550	67,942	76,329	86,976	82,077
6 Statistical Provision	4,411	5,714	976	4,492	4,677	8,392	8,387	10,646	11,249	2,862
7 Statistical Provision after Shift	3,843	1,256	0	0	4,677	8,392	8,387	10,646	0	0
8 Amount Needed from Statistical Fund	0	0	12,265	7,356	0	0	0	0	4,899	86,404
9 Statistical Fund after Shift	69,395	73,238	62,229	54,873	54,873	59,550	67,942	76,329	82,077	0
10 Statistical Fund Limit	78,554	85,940	87,513	93,519	99,649	110,351	121,051	134,567	149,094	153,900
11 Statistical Fund Limit Reversal	0	0	0	0	0	0	0	0	0	0
12 Statistical Fund, End	73,238	74,494	62,229	54,873	59,550	67,942	76,329	86,976	82,077	0
13 ALLL	58,770	64,137	72,323	76,999	77,152	70,990	68,688	68,984	89,004	156,152
14 Total Stock of Provisions	132,008	138,631	134,552	131,872	136,702	138,932	145,017	155,960	171,081	156,152
Income Statement Accounts										
15 LLP	21,814	30,001	43,433	48,196	34,837	26,098	26,610	25,583	57,310	151,244
16 LLP/TLL	0.62%	0.79%	1.12%	1.16%	0.79%	0.53%	0.49%	0.43%	0.86%	2.21%
17 Five-Year Moving Average	0.61%	0.67%	0.78%	0.87%	0.89%	0.88%	0.82%	0.68%	0.62%	0.91%
18 Amount Needed from Statistical Fund	569	4,458	13,242	11,847	0	0	0	0	16,147	89,266

Table 6 (Continued) Dynamic Provisioning Simulation: Example Bank, 1999–2008 (in millions, except TLL)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
19 Amount Taken from Statistical Fund	569	4,458	13,242	11,847	0	0	0	0	16,147	84,939
20 New Loan Loss Provision	21,245	25,543	30,191	36,349	34,837	26,098	26,610	25,583	41,163	66,305
21 Profits Without Statistical Provision	71,556	71,009	73,967	89,861	102,440	104,172	114,016	128,217	97,630	18,726
22 Changes in Provisions under Dynamic Provisioning	3,843	1,256	-12,265	-7,356	4,677	8,392	8,387	10,646	-4,899	-82,077
23 Profits With Statistical Provision	67,713	69,753	86,232	97,217	97,763	95,780	105,629	117,571	102,529	100,803

Figure 7 Aggregate U.S. Bank Reserves Compared to Total and Statistical Reserves as a Percentage of Total Loans, 1993–2008

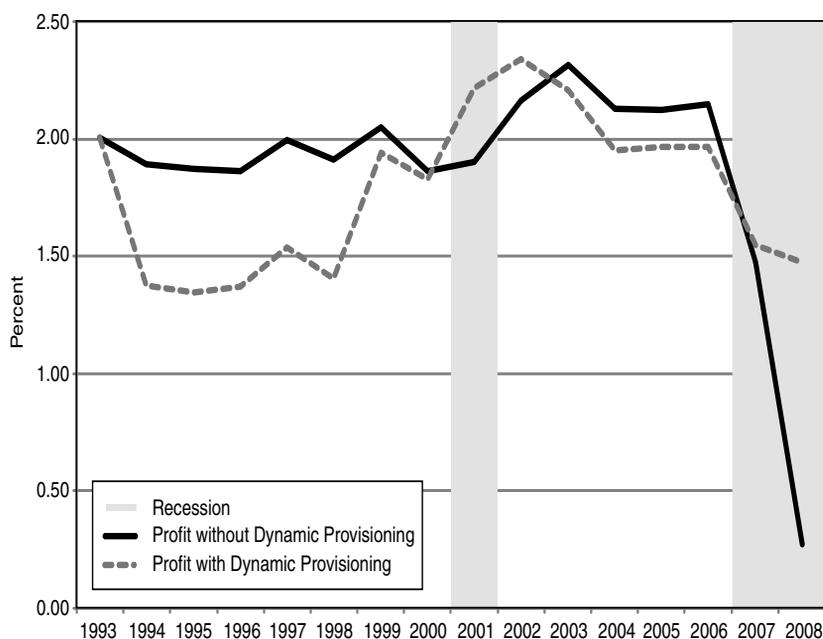


Source: FDIC data.

average of the same ratio, were used to objectively determine if funds were needed from the statistical fund; the difference between a given year's LLP/TLL ratio and the five-year moving average determine exactly how much should be drawn from the statistical fund. The statistical provision in a given year was used to cover as much of the amount needed as possible, and then, if necessary, the remaining amount would be taken from the statistical fund; the amount needed from the statistical fund is listed in line 18, while the actual amount taken is listed in line 19. If funds from the statistical provision and statistical fund were used to cover specific provisions, then the loan loss provision in a given year would change. The new loan loss provision reflecting the changes is shown in line 20, and the changes in provisions under the dynamic provisioning simulation, which has an effect on net income, are shown in line 22. The new net income (profit) under the dynamic provisioning simulation is listed in line 23.

The simulation has several interesting results. First, by allowing the bank to use five years to build the fund (during good times from 1993–1998), the

Figure 8 Aggregate U.S. Bank Net Income Compared to Net Income as a Percentage of Total Loans, 1993–2008



Source: FDIC data.

example bank was able to build a total stock of provisions, both statistical and specific, of 3.9 percent of total loans. When compared to the actual (U.S. aggregate) total allowance for loan and lease losses of 1.7 percent, the bank is clearly better positioned to withstand losses associated with a recession in 1999. The statistical fund was set to be constrained, if necessary, by the aforementioned limit of 1.25 times the latent losses, which was not reached in the simulation.

The second result to note is the impact of a recession, or increase in loan losses, on the statistical fund. Figure 7 shows total provisions and the statistical fund compared to the actual allowance for loan and lease losses. Both the 2001 and current recessions result in declines in the statistical fund, driving down total provisions, compared to large increases in the actual allowance for loan and lease losses. Since the statistical provision is recorded against the income statement, it reduces profits, as demonstrated in the first example

that contrasted dynamic provisioning to the incurred loss model.³³ Figure 8 shows how profits under statistical provisioning compare to actual profits, emphasizing the impact this has on earnings.

The simulation's primary purpose was to depict the results of dynamic provisioning under one possible scenario with representative parameters selected to demonstrate how the policy should work. The selected parameters, combined with the other simplifying assumptions, allow a sizeable fund of statistical provisions to be built in good times and absorb losses in bad times. However, if representative parameters were selected that were too low, higher levels of specific provisioning would have prevented the appropriate fund from being built. Conversely, if higher parameters were selected, then the fund built would have been larger, which could have resulted in inefficiently used capital given the size of realized losses over the time horizon for which the bank provisioned under the policy. This is an important point because the standard approach in the Spanish system is dependent on the parameters estimated by the Bank of Spain.³⁴ The cost of underestimating the risk weights relates to bank-specific solvency, whereas an overestimation of the risk weights is a tax to the bank and could reduce the overall supply of credit.

The simulation illustrates how dynamic provisioning prepared the example bank to weather the economic downturn while remaining profitable and leaving its capital levels in periods of economic growth accurately stated and allowing managers to further build capital if deemed necessary.

5. CONCLUSIONS

Current accounting guidelines require banks to recognize losses prompted by events that make the losses probable and estimable. But this method may be at odds with the bank regulators' desire for banks to build a "war chest" of reserves in good times to be depleted in bad times. In 1998, the SEC required SunTrust Bank to restate its LLR by \$100 million, reflecting the SEC's aversion to what it considered to be an overstated reserve. Remarkably, the action taken by the SEC wasn't long after the banking crises of the 1980s and early 1990s, which, in 1990 alone, resulted in a total provision for loan losses almost twice bank profits (Walter 1991). By the same measure, the financial crisis that began in 2007 was far more severe, resulting in total loan loss provisions greater than eight times bank profits in 2008.³⁵ Following the current episode,

³³ Note that both examples treat loan growth rate as independent of reserve rules. Dynamic provisioning is likely to smooth out loan growth expansion and contraction. One could argue that the rules could impose a high enough cost as to result in lower loan volume through the credit cycle.

³⁴ Even banks that use internal models are subject to approval by the Bank of Spain. Presumably, the approval process could involve some reference to the standard risk weights.

³⁵ FDIC Quarterly Banking Profile, December 31, 2008.

Table 7 Aggregate Condition and Income Data: All Commercial Banks, 2008 (in millions)

Assets		Liabilities and Capital	
Total Loans and Leases	\$6,839,998	Deposits	\$8,082,104
Less: Reserve for Loss	156,152	Other Borrowed Funds	2,165,821
Net Loans and Leases	6,683,846	Subordinated Debt	182,987
Securities	1,746,539	All Other Liabilities	724,353
All Other Assets	3,882,529	Equity Capital	1,157,648
Total Assets	12,312,914	Total Liabilities and Capital	12,312,914

Source: FDIC Quarterly Banking Profiles, 2008.

many have called for revisiting the loan loss provisioning method so as to allow for the “war chest” approach and to mitigate the current approach’s procyclical effects.

We compared the incurred loss (as implemented in the United States) and dynamic provisioning (as implemented in Spain) approaches. Through a basic example we illustrated that the key difference is not the aggregate level of provisioning but the timing of the provisioning. We conducted an empirical simulation to illustrate that a dynamic provisioning framework, like the one implemented in Spain, could have allowed for a build-up of reserves during the boom years in the United States. The results demonstrate that the alternate framework would have smoothed bank income through the cycle and the need to provision for loan losses would have been significantly lower during the financial crisis of 2007–2009.

Both in the context of a conceptual framework and through an empirical simulation, we highlighted that dynamic provisioning could mitigate some of the problems associated with the current U.S. system. Even so, it would be premature to advocate the adoption of dynamic provisioning in the United States. We have three reasons for this opinion. First, the distortions embedded in the current U.S. system need to be more fully understood and quantified. Second, although 2006 is a relevant point in time for measuring the efficacy of the Spanish policies, Spanish banking needs to be studied through this cycle and the lessons learned need to be included in potential reform. Third, and most important, the U.S. approach to loan loss reserves should not be reformed independently of other bank capital regulation reform.³⁶

³⁶To allow for a focus on LLR issues, this article abstracted away from any discussion of broader reform of regulatory capital.

Figure 10 Balance Sheet Accounts

Any Asset Account		Any Liability Account		Any Shareholder's Equity Account	
Beginning Balance			Beginning Balance		Beginning Balance
Increases +	Decreases -	Decreases -	Increases +	Decreases -	Increases +
Debit	Credit	Debit	Credit	Debit	Credit
Ending Balance			Ending Balance		Ending Balance

the total loans and leases, is the reserve for losses, an account that represents the total value of loans and leases that managers expect is probable to not be collected as of the balance sheet data.

To fully understand the reserve for losses, a brief review of accounting basics is helpful. Figure 9 helps provide a simplified understanding of the balance sheet accounts: assets, liabilities, and shareholders' equity. The most important concept is the relationship between the income statement accounts (revenue and expenses) and shareholders' equity. Net income for a firm is computed as revenues for the period minus expenses. Net income flows to shareholders' equity, dividends are paid, and the remaining funds are added to the accumulated retained earnings. And, since retained earnings and contributed capital make up shareholders' equity, negative retained earnings will reduce total capital.

Another important concept is that of credits and debits. As shown in Figure 10, a debit serves to increase an asset account, while it reduces a liability and shareholders' equity account. That is, referencing Table 7, loans and leases, securities, and all other assets are increased with a debit to their respective accounts and therefore, at yearend, should have a remaining debit balance. A credit to those accounts would serve to reduce the value of assets on the balance sheet.

In accounting, there are contra-accounts—assets, liabilities, or shareholders' equity accounts that have a negative balance for the account; the opposite of where Figure 10 has the beginning balances shown. The reserve for loan losses is an example of a contra-asset. As previously mentioned, the purpose of

Table 8 Aggregate Condition and Income Data: All Commercial Banks, 2008 (in millions)

	Income Data	
Total Interest Income		\$530,513
Total Interest Expense		210,569
Net Interest Expense		319,944
Provision for Loan and Lease Losses		151,244
Total Noninterest Income		193,853
Total Noninterest Expense		329,050
Securities Gains (Losses)		−14,066
Applicable Income Taxes		6,163
Extraordinary Gains, Net		5,452
<hr/>		
Net Income		18,726
Net Charge-offs		87,990
Cash Dividend		42,724
Retained Earnings		22,355

the reserve for losses is to accurately reflect the value of total loans and leases on the balance sheet. As a contra-asset—meaning it has a negative (credit) asset balance—it serves to reduce the value of assets by the amount that bank managers believe it will not collect; hence, it reflects the true value of loans and leases to the bank. The reserve for losses is increased on a quarterly basis when losses are recognized and charged against income through an account called the provision for loan and lease losses. The income statement results for all FDIC-insured commercial banks (Table 8) show that the total provision for loan and lease losses was \$151,244, greater than eight times bank profits (net income).

The provision for loan and lease losses is an expense account. All income statement accounts (i.e., revenues and expenses) affect shareholders' equity. An expense account is a debit to shareholders' equity and reduces its value. Therefore, the provision for loan and lease losses reduces net income and shareholders' equity.

REFERENCES

- Ahmed, Anwer S., Carolyn Takeda, and Shawn Thomas. 1999. "Bank Loan Loss Provisions: A Reexamination of Capital Management, Earnings Management, and Signaling Effects." *Journal of Accounting and Economics* 28 (November): 1–25.

- Angklomkiew, Sarawan, Jason George, and Frank Packer. 2009. "Issues and Developments in Loan Loss Provisioning: The Case of Asia." *BIS Quarterly Review* December: 69–83.
- Banco de España. 2008. "Report on Banking Supervision in Spain." www.bde.es/informes/be/supervi/2008/MBS2008.pdf.
- Benston, George J., and Larry D. Wall. 2005. "How Should Banks Account for Loan Losses?" Federal Reserve Bank of Atlanta *Economic Review* Q4: 19–38.
- Berger, Allen N., and Gregory F. Udell. 2003. "The Institutional Memory Hypothesis and the Procyclicality of Bank Lending Behavior." *Journal of Financial Intermediation* 13 (October): 458–95.
- Bernanke, Ben S., and Cara S. Lown. 1991. "The Credit Crunch." *Brookings Papers on Economic Activity* 22: 205–48.
- Bernanke, Ben. 2009. "Financial Reforms to Address Systemic Risk." Remarks at the Council on Foreign Relations. Washington, D.C.: March 10, 2009.
- Bouvatier, Vincent, and Laetitia Lepetit. 2008. "Banks' Procyclical Behavior: Does Provisioning Matter?" *Journal of International Financial Markets, Institutions, and Money* 18 (December): 513–26.
- Catan, Thomas, and Jonathan House. 2008. "Spain's Bank Capital Cushions Offer a Model to Policy Makers." *The Wall Street Journal*, 10 November, A12.
- Cohen, Adam. 2009. "EU Ministers Criticize Banking Rules." *The Wall Street Journal*, 8 July.
- Davis, Peter O., and Darrin Williams. 2004. "Credit Risk Measurement: Avoiding Unintended Results: Part 4: Loan Loss Reserves and Expected Losses." *The RMA Journal*, October.
- Dugan, John. 2009. "Loan Loss Provisioning and Procyclicality." Remarks before the Institute of International Bankers, March 2, 2009.
- Eisenbeis, Robert. 1998. "Comment on Hancock and Wilcox." *Journal of Banking and Finance* 22 (August): 1,015–7.
- Fernández de Lis, Santiago, Jorge Martínez Pagés, and Jesús Saurina. 2000. "Credit Growth, Problem Loans and Credit Risk Provisioning in Spain." Working Paper 0018. The Bank of Spain.
- Financial Stability Forum. 2009. "Report of the FSF Working Group on Provisioning." www.financialstabilityboard.org/publications/r_0904g.pdf.

- Garcia-Herrero, Alicia, and Santiago Fernández de Lis. 2008. "The Housing Boom and Bust in Spain: Impact of the Securitization Model and Dynamic Provisioning." Working Paper 0808, Economic Research Department, BBVA.
- Hancock, Diana, and James Wilcox. 1998. "The 'Credit Crunch' and the Availability of Credit to Small Businesses." *Journal of Banking and Finance* 22 (August): 983–1,014.
- International Monetary Fund. 2006. "Spain: Financial System Stability Assessment, including Reports on the Observance of Standards and Codes on the following topics: Banking Supervision, Insurance Supervision, Securities Supervision, Payment Systems, Securities Settlement Systems, and Financial Policy Transparency." IMF Country Report No. 06/212.
- Laeven, Luc, and Giovanni Majnoni. 2003. "Loan Loss Provisioning and Economic Slowdowns: Too Much, Too Late?" *Journal of Financial Intermediation* 12 (April): 178–97.
- Lucas Jr., Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1 (January): 19–46.
- Mann, Fiona, and Ian Michael. 2002. "Dynamic Provisioning: Issues and Application." *Financial Stability Review* December: 128–36.
- Peek, Joe, and Eric Rosengren. 1995. "The Capital Crunch: Neither a Borrower, Nor a Lender Be." *Journal of Money, Credit and Banking* 27 (August): 625–38.
- Pennacchi, George G. 2005. "Risk-based Capital Standards, Deposit Insurance and Procyclicality." *Journal of Financial Intermediation* 14 (October): 432–65.
- Poveda, Raimundo. 2000. "Reform of the System of Insolvency Provisions." Speech given at the APD, Madrid: January 18, 2000.
- Rajan, Raghuram G. 1994. "Why Bank Credit Policies Fluctuate: A Theory and Some Evidence." *Quarterly Journal of Economics* 109 (May): 399–441.
- Saurina, Jesús. 2009a. "Dynamic Provisioning: The Experience of Spain." Crisis Response: Public Policy for the Private Sector, Note Number 7 (July). The World Bank Group.
- Saurina, Jesús. 2009b. "Made in Spain – and Working Well." *Financial World*, April, 23–4.

- Saurina, Jesús. 2009c. "The Issue of Dynamic Provisioning: A Case Study." Presentation to the Financial Reporting in a Changing World, European Commission Conference, Brussels: May 7–8.
- Saurina, Jesús. 2009d. "Loan Loss Provisions in Spain. A Working Macroprudential Tool." www.bde.es/webbde/Secciones/Publicaciones/InformesBoletinesRevistas/RevistaEstabilidadFinanciera/09/Noviembre/ief0117.pdf.
- Stickney, Clyde P., and Roman L. Weil. 2007. *Financial Accounting: An Introduction to Concepts, Methods, and Uses*. Mason, Ohio: Thomson Higher Education.
- Wall, Larry D., and Timothy W. Koch. 2000. "Bank Loan Loss Accounting: A Review of Theoretical and Empirical Evidence." Federal Reserve Bank of Atlanta *Economic Review* Q2: 1–20.
- Walter, John R. 1991. "Loan Loss Reserves." Federal Reserve Bank of Richmond *Economic Review* 77 (July): 20–30.