WP/12/124

IMF Working Paper

Do Dynamic Provisions Enhance Bank Solvency and Reduce Credit Procyclicality? A Study of the Chilean Banking System

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INTERNATIONAL MONETARY FUND

 WP/12/124

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Western Hemisphere Department

Do Dynamic Provisions Enhance Bank Solvency and Reduce Credit Procyclicality? A Study of the Chilean Banking System*

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May 2012

Abstract

Dynamic provisions could help to enhance the solvency of individual banks and reduce procyclicality. Accomplishing these objectives depends on country-specific features of the banking system, business practices, and the calibration of the dynamic provisions scheme. In the case of Chile, a simulation analysis suggests Spanish dynamic provisions would improve banks' resilience to adverse shocks but would not reduce procyclicality. To address the latter, other countercyclical measures should be considered.

JEL Classification Numbers: G21, G28, C5

Keywords: Dynamic provisions, procyclicality, simulation, banks, Chile

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* This paper benefits from comments by Jorge Cayazzo, Francesco Columba, Dora Iakova, Alessandro Giustiniani, seminar participants at the Central Bank of Chile, and especially Patricio Jaramillo, David Pacheco, and Torsten Wezel. The data was kindly provided by the Superintendencia de Bancos e Instituciones Financieras de Chile. Any errors and omissions are the author's sole responsibility

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I. INTRODUCTION

It has long been acknowledged that procyclicality could pose risks to financial stability as noted by the academic and policy discussion centered on Basel II, accounting practices, and financial globalization.[1] Recently, much attention has been focused on regulatory dynamic provisions (or statistical provisions). Under dynamic provisions, as banks build up their loan portfolio during an economic expansion, they should set aside provisions against future losses.[2]

The use of dynamic provisions raises two questions bearing on financial stability. First, do dynamic provisions reduce insolvency risk? Second, do dynamic provisions reduce procyclicality? In theory the answer is yes to both questions. Provided loss estimates are roughly accurate, bank solvency is enhanced since buffers are built in advance ahead of the realization of large losses. Regulatory dynamic provisions could also discourage too rapid credit growth during the expansionary phase of the cycle, as it helps preventing a relaxation of provisioning practices.

However, when real data is brought to bear on the questions above the answers could diverge from what theory implies. This paper attempts to answer these questions in the specific case of Chile. It finds that the adoption of dynamic provisions could help to enhance bank solvency but it would not help to reduce procyclicality. The successful implementation of dynamic provisions, however, requires a careful calibration to match or exceed current provisioning practices, and it is worth noting that reliance on past data could lead to a false sense of security as loan losses are fat-tail events. Finally, since dynamic provisions may not be sufficient to counter procyclicality alternative measures should be considered, such as the proposed countercyclical capital buffers in Basel III and the countercyclical provision rule Peru implemented in 2008.

Below, section II explains the rationale for dynamic provisions concisely for the benefit of the reader unfamiliar with the literature. Section III describes the Spanish model. Section IV discusses the results of a simulation analysis of the Spanish model calibrated to Chilean banks. Section V analyzes the joint dynamics of aggregate provisions and domestic credit. Section VI concludes.

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[1] Borio, Furfine, and Lowe (2000) are among the first to discuss the interaction between procyclicality and financial stability; Brunnermeier et al (2010) provide a more recent discussion building on the experience of the 2008–09 crisis. Regulatory and accounting practices could contribute to procyclicality: see for instance Gordy and Howells (2006), and Plantin, Sapra, and Shin (2008); which may have been further exacerbated as the financial systems become globally integrated (Chan-Lau, 2008).

[2] Dynamic provisions were first introduced in Spain in 2000 (Poveda, 2000, and Fernández de Lis, Martínez Pagés, and Saurina, 2000).

II. The Rationale for Dynamic Provisions

Provisions, together with capital, ensure the viability and solvency of a bank by protecting it against loan portfolio losses. But banks have strong incentives for under-reporting provisions, including differences in the tax treatment of general and specific provisions and compensation schemes directly related to lending volumes, profits, and earnings (see Box 1). The practice of under-reporting provisions during good times appears common in both advanced and emerging market countries (Bikker and Metzemakers, 2005).

Under-reporting of provisions contributes to procyclicality (Brunnermeier et al, 2009, Burroni et al, 2009). During good times it raises net income and bank capital enabling a substantial acceleration of the loan flow. When the cycle turns, a credit crunch is likely to ensue as under-provisioned banks need to provision against large losses out of meager earnings. For large enough losses, banks could incur substantial capital losses and fail.

Dynamic provisions aim to improve upon standard provision practices by requiring them to build up provision buffers ahead of realized losses. All regulatory dynamic provisions schemes build on the principle that provisions should be set in line with estimates of long-run, or through-the-cycle expected losses (Mann and Michael, 2002), and can be expressed as variations of the formula below (Burroni et al, 2009):

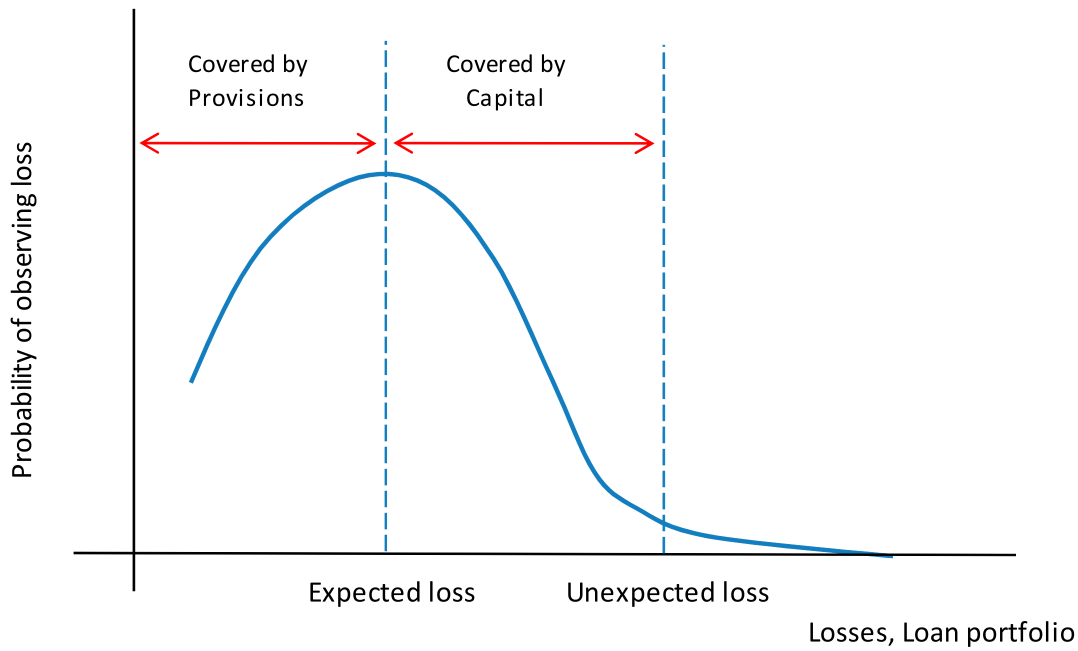
(1) Dynamic provisions = Through-the-cycle Loss Ratio × Flow of New Loans
Minus Flow of Specific Provisions,

where specific provisions correspond to realized losses. Equation (1) shows that during good times dynamic provisions are positive and add up to loss provisions as realized losses are lower than their through-the-cycle estimates. During bad times, the opposite takes place and negative dynamic provisions deplete the loss provision buffer. Hence, provisions consistent with consistent with through-the-cycle estimates reduce the probability of failure of banks during a downturn.[3] Moreover, by smoothing provisions, dynamic provisions lead to smooth earnings over the cycle and dampen procyclicality.

[3] Dynamic provisions are criticized n the basis that income and profit smoothing works against financial statement transparency (FASB-IASB, 2009). The Financial Stability Board, and the Basel Committee on Banking and Supervision, the International Accounting Standard Board and the U.S. Financial Accounting Standard Board published a proposed common solution for impairment accounting for public comments on January 31, 2011.

Box 1: Provisions, Capital, and their Tax and Regulatory Treatment

To guard against losses in the loan portfolio, banks set aside provisions and capital. Provisions can be either general, to account for expected losses in the portfolio that have yet to be identified since they have not realized yet; or specific, to account for losses from specific impaired loans and write-offs. Because ex-ante loss estimates may differ from realized losses a bank holds another buffer, capital, to be able to cover unexpected losses, or losses beyond the mean ex-ante estimate. Clearly, the adequacy of provisions and capital to withstand losses depends on how reliable the estimated loss distribution is.



Additions to provisions reduce reported profits but are accounted differently. Specific provisions are considered a current expense and can be deducted from taxes. General provisions are considered appropriations of retained earnings so their increase reduces the capital of the bank. The differential tax treatment provides banks with incentives to under-report general provisions. Under Basel II, the incentive was partly offset by the allowance to count general provisions towards Tier II capital up to a maximum of 1.25 percent of risk-weighted assets (Sunley, 2003, and Ryan, 2007).

III. THE SPANISH DYNAMIC PROVISIONS FORMULA

As described in Saurina (2009), the Spanish dynamic provisions formula is designed to build up general provisions that account for: (1) expected losses in new loans extended in a given period; and (2) expected losses on the outstanding stock of loans at the end of that period after netting off specific provisions incurred during the period.[4]

Algebraically, for new loans of an homogeneous category k, ΔC_t^k, general provisions, GP_t, should be increased by the amount $\alpha^k \Delta C_t^k$, where α^k is representative of the average credit losses during a business cycle of loans in category k. This first component is an incremental provision that account for expected losses in new loans.

It is also necessary to hold an amount of specific provisions reflecting the average specific provisions made during the business cycle but that have not realized yet. This amount is equal to $\beta^k C_t^k$, where $\beta^k$is the average specific provision for loans in category k and C_t^k is the outstanding amount of loans. Finally, the specific provisions component should be corrected for specific provisions already incurred during the period, SP_t^k . As a result, provisions accumulate according to the formula below:

$$GP_t = \sum_{k=1}^{N} \left(\alpha^k \Delta C_t^k + \beta^k C_t^k - SP_t^k \right), \tag{2}$$

where the different loan categories, and the choice of parameters in the formula above are determined by the banking regulatory agency for all banks, as is the case in Spain, or could be calibrated individually for each bank based on individual historical data on loan losses and provisions.

The Spanish system allows for six different loan categories in ascending order of risk: negligible risk, low risk, medium-low risk, medium-risk, medium-high risk, and high risk. The general provision parameters, or alpha-parameters, corresponding to these groups are 0, 0.6, 1.5, 1.8, 2, and 2.5 percent respectively; and the specific provision parameters, or beta-parameters, are 0, 0.11, 0.44, 0.65, 1.1, and 1.64 percent respectively. The system also specifies that cumulative provisions should not exceed 125 percent of the inherent losses of the loan portfolio, $\sum_{k=1}^{N} \alpha^k C_t^k$.

Equation (2) indicates that banks can reduce their stock of provisions when specific provisions exceed expected losses from new loans and expected average specific provisions, a situation encountered during an economic downturn. Therefore, successful implementation of a dynamic provisions system hinges on building up an adequate stock of provisions early on in the credit cycle.

[4] For a concise description of dynamic provision regimes other than the Spanish one, see Chan-Lau (2011).

IV. Dynamic Provisions and Bank Solvency in Chile: A Simulation Analysis

The assessment of bank solvency under the Spanish dynamic provision rule was based on a simulation analysis. The analysis used data for 14 commercial banks established in Chile. The data contains end-month information on the outstanding stock of consumer, commercial, and mortgage loans from January 2004 to June 2010. The data set also includes information on provisions, recovery in the event of default, and loan write-offs.

The parameters in the dynamic provision formula (equation 2) were calibrated individually for each bank based on its historical data on loan portfolios, provisions, and loan losses for three different loan categories: consumer loans, commercial loans, and mortgage loans. The choice of an individual bank calibration rather than a system-wide calibration was guided by substantial differences in business models across banks, which suggests a one-size-fits-all model may not be appropriate. For instance, some banks are not active in mortgage lending, and some banks lend mainly to upper-income households while others target the middle and low-middle income sectors.

Simulation analysis was used to assess differences in bank solvency under the provisioning regime prevalent prior to January 2011 and under dynamic provisions. The simulation analysis was based on 20000 draws of a loan loss cycle lasting 78 months (6½ years) for each bank.[5] In each simulation draw, the initial stock of provisions was set equal to 1.5 percent of the total amount of outstanding loans. The loan origination in each loan category, consumer, commercial, and mortgages was set equal to the observed historic series. Dynamic provisions were calculated using historical bank-specific data on loan losses and recoveries. For each bank, the aggregate losses were generated randomly from either unit root or autoregressive processes of order one (AR(1)) fitted to the bank's historical write-off series to capture as close as possible the cyclical nature of loan losses. Since the residuals in the estimated processes exhibit non-normality, they were generated from extreme value distributions fitted to the data (Table 1). Once the artificial write-off data was generated, the paths of provisions under the current regime and dynamic provisions were calculated.

[5] Other studies use counterfactual simulation based on historical data to assess the hypothetical performance of provisions under a dynamic provisions. In a counterfactual simulation, the loan and loan losses data is taken as given, and provisions are calculated according to the dynamic provision rule. The counterfactual provision time series under the dynamic provisions rule is then contrasted with the historical provision time series. See for instance Balla and McKenna (2009), Burroni et al (2009), Fillat and Montoriol-Garriga (2010), Saurina (2009), and Wezel (2010),.

Table 1. Write-off Series: Unit Root Tests; AR(1) Coefficients, and Extreme Value Distribution Parameters

	Augmented Dickey-Fuller test		AR(1)	Residuals, EV distribution 3/	
Bank	t-statistics	p-values 1/	coefficient 2/	Location	Scale
1	-8.28	0.00	0.17	154.6	309.0
2	-1.43	0.56	1.00	1435.9	3273.9
3	-9.20	0.00	0.17	540.6	1109.3
4	-2.77	0.07	0.93	2545.8	5095.5
5	-0.74	0.83	1.00	510.2	1100.7
6	-1.45	0.55	1.00	848.8	1674.4
7	-1.12	0.70	1.00	293.3	729.4
8	-3.62	0.01	0.35	2923.7	4589.5
9	-4.72	0.00	0.23	311.1	491.6
10	-2.05	0.27	1.00	258.9	626.8
11	-1.77	0.39	1.00	1424.6	2785.0
12	-7.67	0.00	0.23	5388.6	12779.9
13	-7.84	0.00	0.59	571.5	903.4
14	-2.53	0.11	1.00	1029.6	2439.3

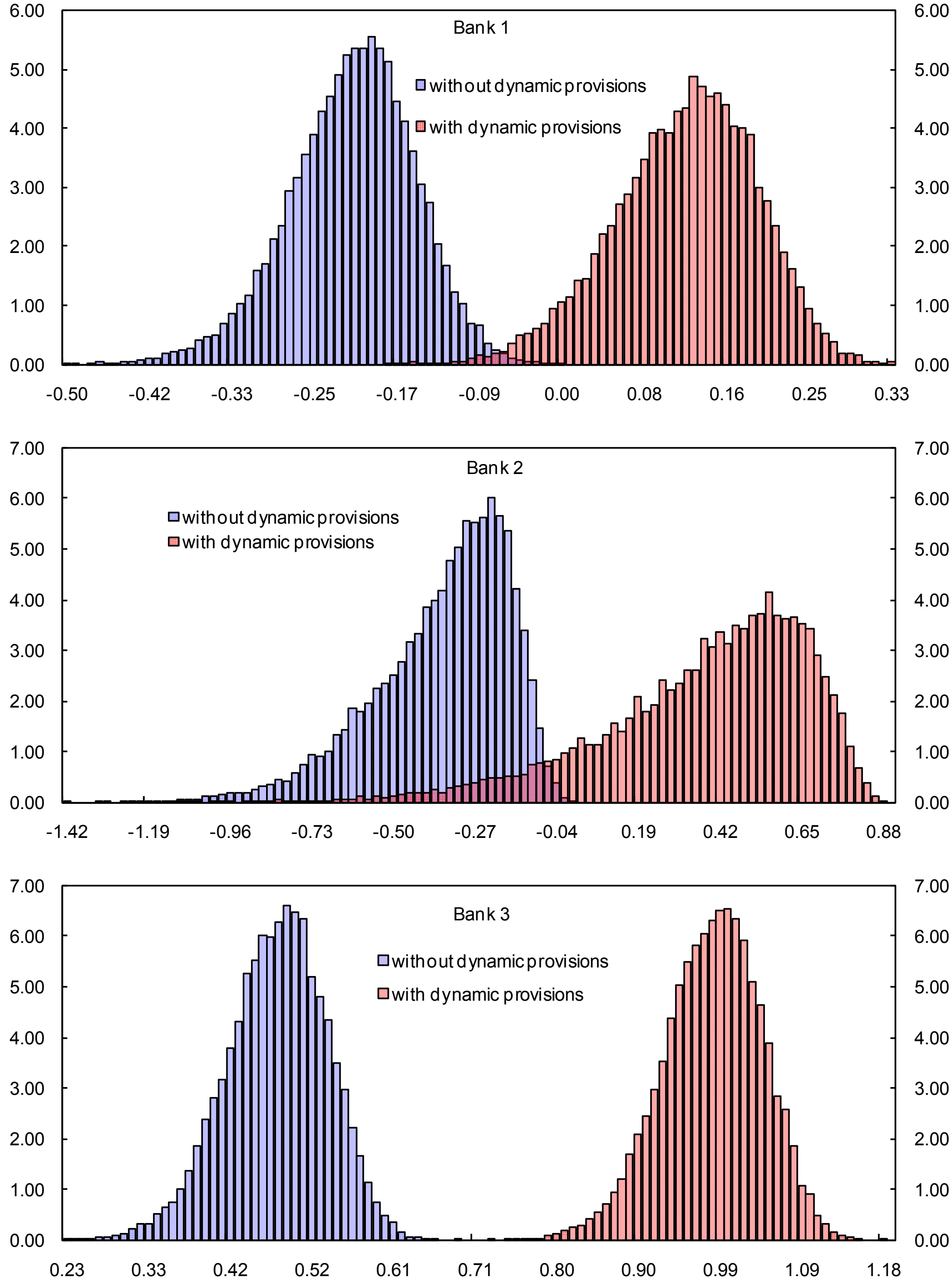
Source: SBIF and author calculations.
1/ McKinnon one-sided probabilities.
2/ A value of 1 indicates write-offs follow a unit root process.
3/ Extreme value distribution type 1, fitted to residuals of unit root or AR(1) process, in million pesos.

After performing the simulation, the impact of the different provisioning regimes processes was assessed by examining the distribution of the minimum provision buffer, or minimum provision shortfall. In each simulation draw, the minimum provision buffer was calculated as the lowest level of provisions net of write-offs (or loan losses) measured in percent of total loans. If the minimum provision buffer was negative, it indicated that the bank could not meet the loan losses using provisions exclusively. Figure 1 shows the distribution of the minimum provision buffer under regimes with and without dynamic provisions.

The adoption of dynamic provisions improves substantially the solvency of Chilean financial institutions. Under dynamic provisions, the distribution of the minimum provision buffer shifts markedly to the right, implying a lower likelihood that the provisions would be insufficient to cover bank losses. Because loan losses exhibit fat-tails, even the introduction of a dynamic provisions regime could not avoid prevent provisions from falling short as shown by negative realizations of the minimum provision buffer. Nevertheless, the likelihood and magnitude of these events are lower than under standard provisioning.

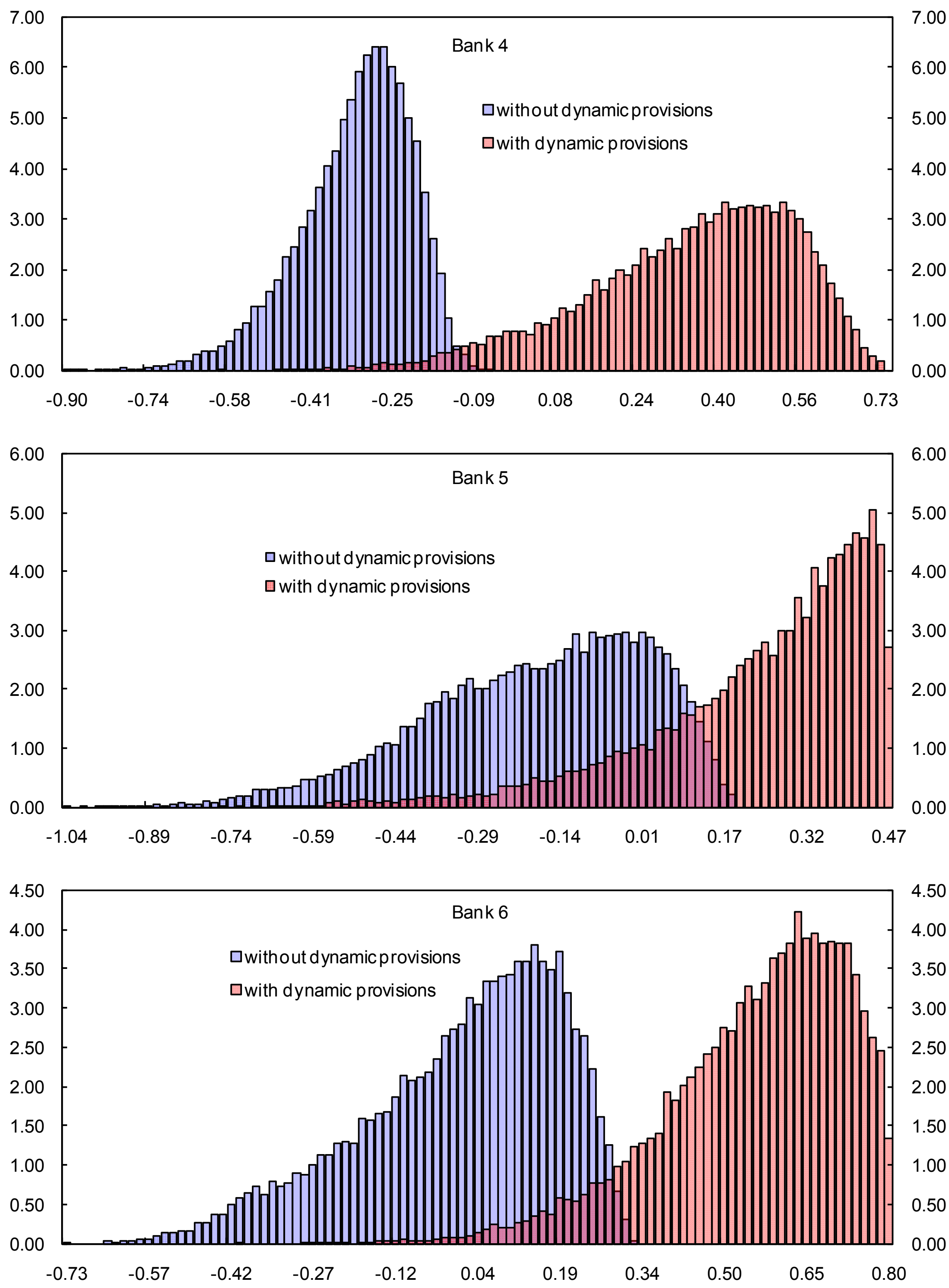
Dynamic provisions do not make a substantial difference in the case of Bank 13. This is likely owing to the fact that losses are extremely large relative to the initial stock of total provisions. Nevertheless, this particular case shows that calibration based in historical data, i.e., the 1.5 percent initial provision stock, could be misleading when loan losses exhibit fat-tail behavior.

Figure 1. Minimum provision buffer, probability distributions 1,2/



Source: SBIF and staff calculations.
1/ Horizontal axis: provisions in percent of total loans; vertical axis; probability, in percent.
2/ A negative number indicates that provisions are insufficient to cover loan losses.

Figure 1 (cont.). Minimum provision buffer, probability distributions 1,2/



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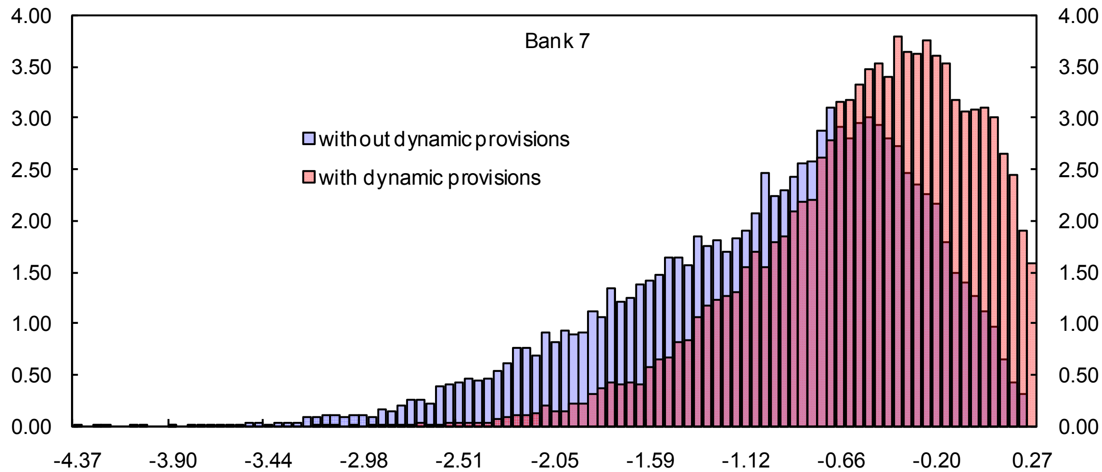

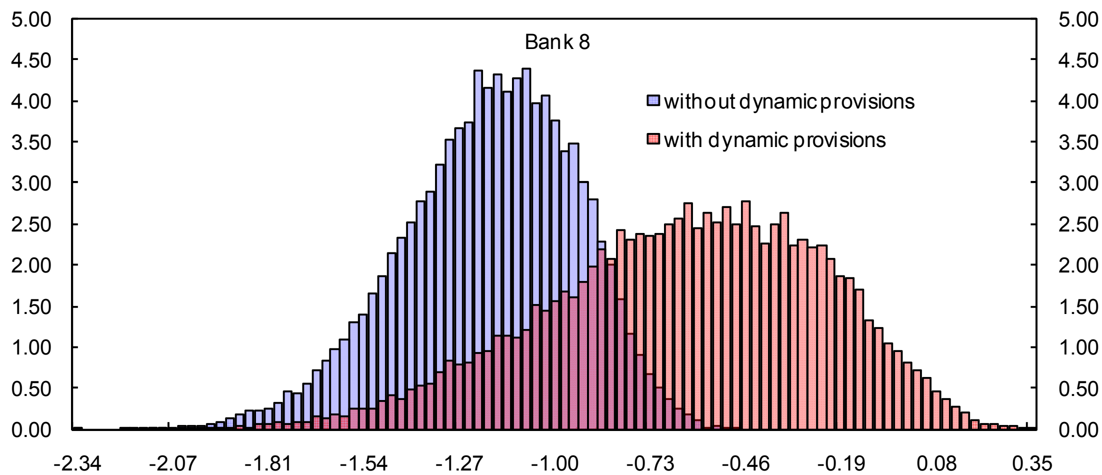

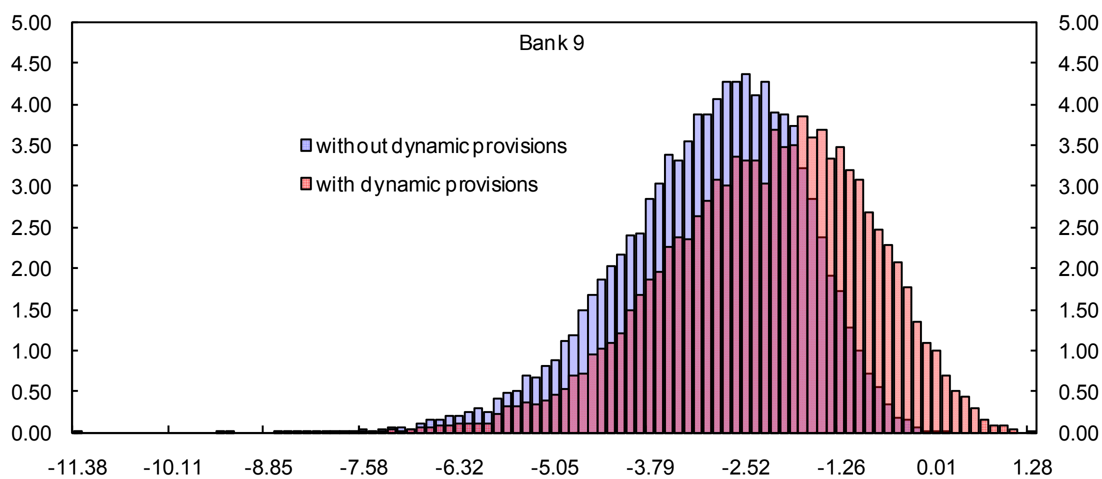

Source: SBIF and staff calculations.
1/ Horizontal axis: provisions in percent of total loans; vertical axis; probability, in percent.
2/ A negative number indicates that provisions are insufficient to cover loan losses.

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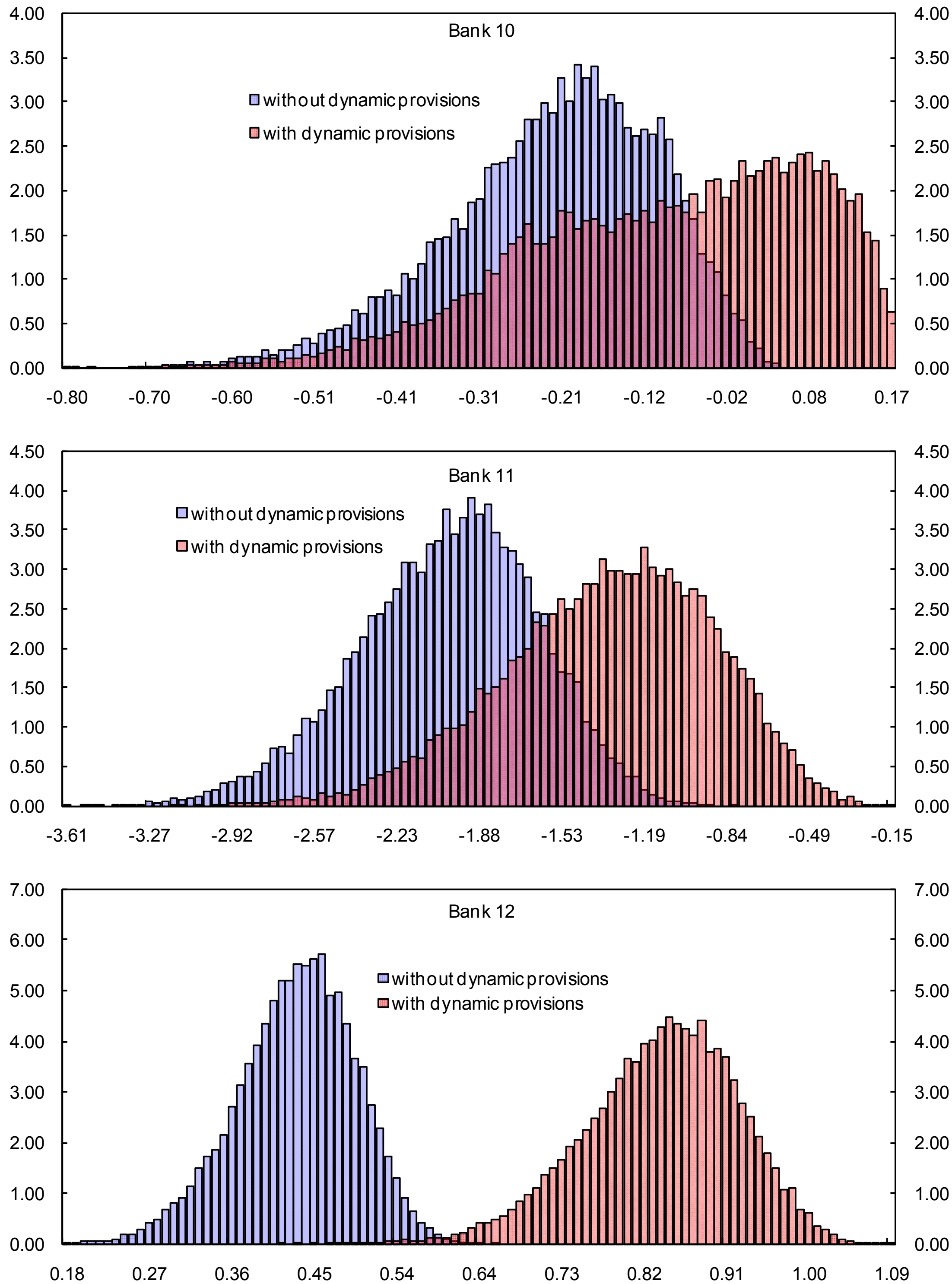
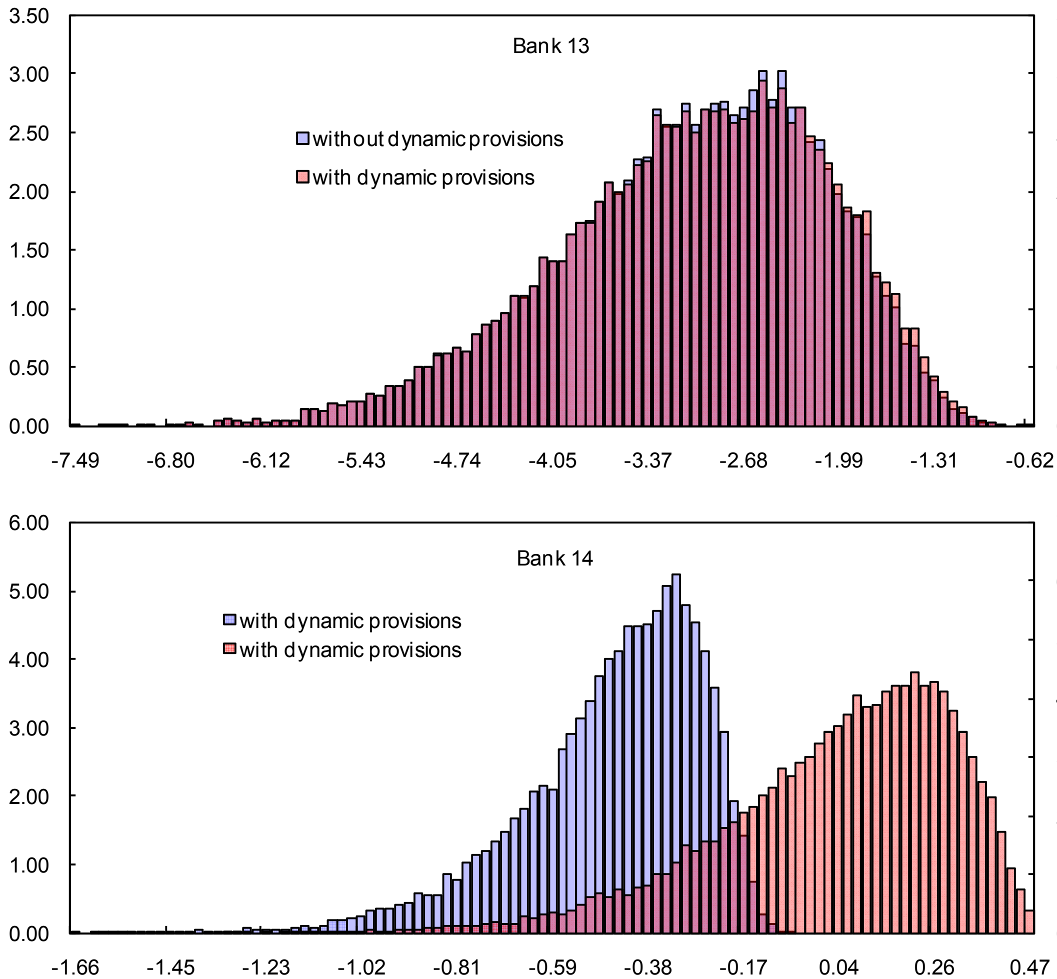


Source: SBIF and staff calculations.
1/ Horizontal axis: provisions in percent of total loans; vertical axis; probability, in percent.
2/ A negative number indicates that provisions are insufficient to cover loan losses.

Figure 1 (cont.). Minimum provision buffer, probability distributions 1,2/



Source: SBIF and staff calculations.

1/ Horizontal axis: provisions in percent of total loans; vertical axis; probability, in percent.

2/ A negative number indicates that provisions are insufficient to cover loan losses.

The descriptive statistics of the minimum provision buffer distributions also illustrate how dynamic provisions could contribute to enhance bank solvency. (Table 2). For almost every bank, the mean and median of buffers in regime with dynamic provisions are higher than in a regime without them. The kurtosis in the dynamic provisions regime tends to be higher but since the mean is also higher, the left-tail minimum buffers are smaller.

Table 2. Minimum Provision Buffers, Descriptive Statistics

Bank	Without dynamic provisions						With dynamic provisions					
	Mean	Median	Standard deviation	Skewness	Kurtosis	VaR 95	Mean	Median	Standard deviation	Skewness	Kurtosis	VaR 95
1	-0.21	-0.21	0.06	-0.37	3.40	-0.33	0.12	0.13	0.07	-0.35	3.06	0.00
2	-0.36	-0.32	0.19	-0.94	3.83	-0.72	0.39	0.44	0.29	-1.06	4.26	-0.18
3	0.48	0.48	0.06	-0.29	3.06	0.38	0.98	0.99	0.06	-0.31	3.09	0.88
4	-0.32	-0.31	0.11	-0.77	3.67	-0.53	0.35	0.38	0.21	-0.72	3.15	-0.05
5	-0.18	-0.15	0.21	-0.61	2.90	-0.55	0.23	0.29	0.20	-1.31	4.67	-0.17
6	0.01	0.05	0.19	-0.75	2.97	-0.36	0.56	0.59	0.17	-0.95	3.87	0.23
7	-1.00	-0.87	0.71	-0.73	3.18	-2.34	-0.54	-0.46	0.53	-0.86	3.73	-1.54
8	-1.18	-1.16	0.25	-0.42	3.08	-1.62	-0.63	-0.61	0.39	-0.39	2.82	-1.32
9	-3.00	-2.86	1.22	-0.63	3.56	-5.20	-2.26	-2.14	1.37	-0.51	3.36	-4.66
10	-0.22	-0.21	0.12	-0.62	3.26	-0.45	-0.09	-0.07	0.17	-0.56	2.72	-0.39
11	-2.01	-1.99	0.38	-0.35	3.03	-2.68	-1.33	-1.30	0.44	-0.40	2.96	-2.11
12	0.43	0.44	0.07	-0.35	3.08	0.32	0.84	0.84	0.08	-0.43	3.20	0.69
13	-3.07	-2.96	0.96	-0.57	3.14	-4.83	-3.05	-2.95	0.98	-0.55	3.09	-4.83
14	-0.46	-0.42	0.20	-1.11	4.65	-0.85	0.04	0.09	0.26	-0.96	3.99	-0.46

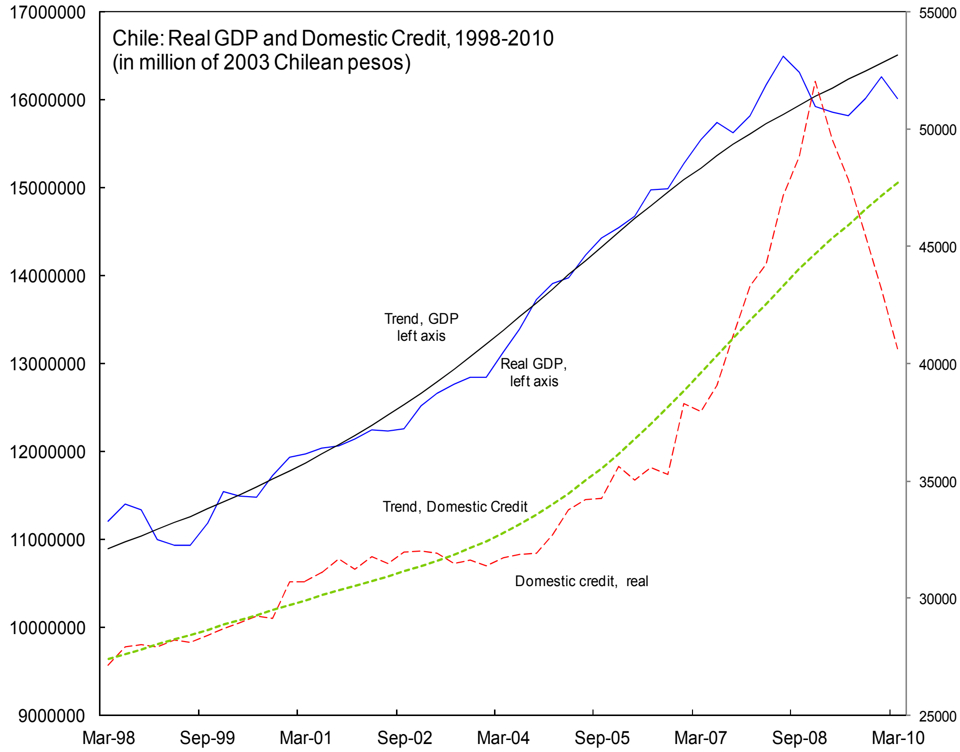
Source: SBIF and staff calculations.

V. Do Provisions Help Reduce Procyclicality in Chile?

From early 1998 until mid-2007, domestic credit grew roughly in line with real GDP at an average annual pace of 3½ percent (Figure 2). From 2007Q3 to 2008Q3, however, domestic credit accelerated rapidly, growing by 14½ percent on an annual basis. In contrast, real GDP grew only by 5½ percent during the same period. After peaking in December 2008, real credit dropped abruptly below trend as the economy slowed down due to the global financial crisis.

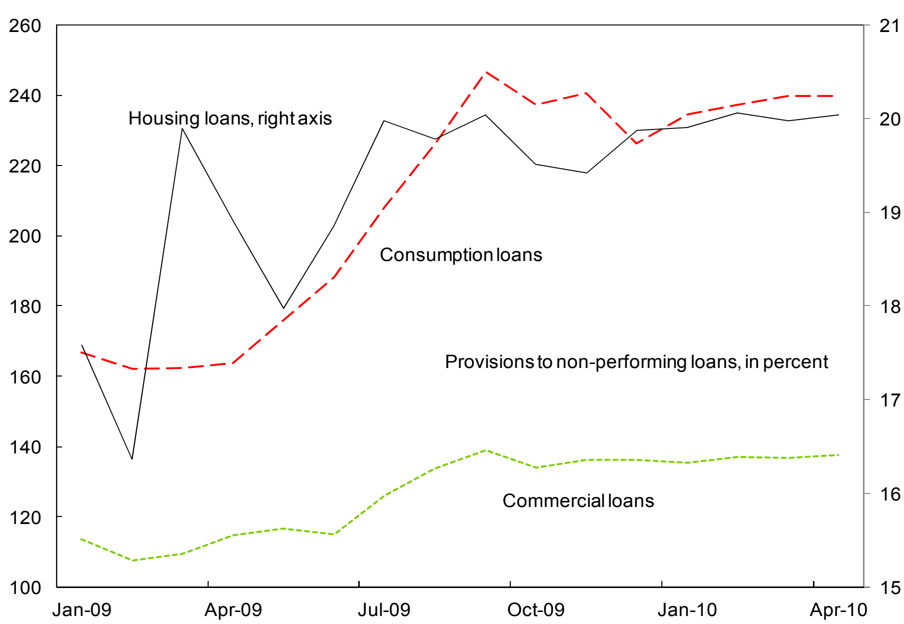
Notwithstanding the rapid credit expansion, the ratio of non-performing loans only increased slightly despite the severity of the financial crisis in 2008–9 and the earthquake in 2010. Banks, nevertheless, started to increase their provisions in the second half of 2009, especially for consumption loans. The short-lived nature of the impact of the earthquake on the ongoing economic recovery may explain why provisions did not increase in March–April 2010 (Figure 3). In addition, a simple trend decomposition based on the use of a Hodrick-Prescott filter indicates that real credit cycle is highly correlated with real GDP cycle. These two variables also appear to lead the provision cycle, implying that provisions lag rather than lead the credit cycle

Figure 2. Chile: Real GDP and Domestic Credit, 1998–2010



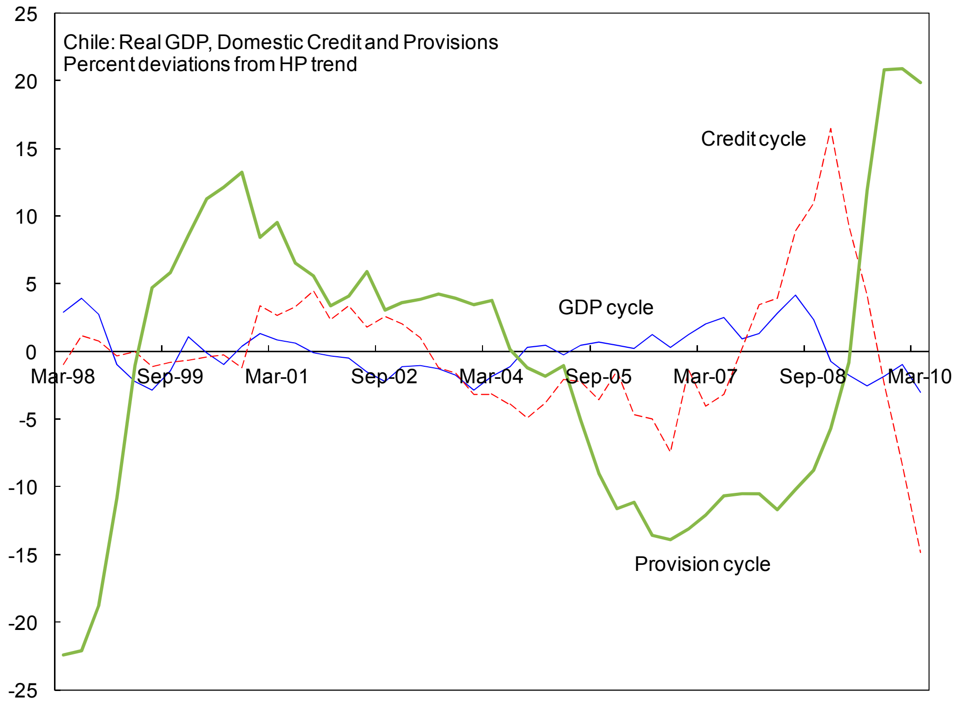
Source: Haver Analytics and author's calculations.

Figure 3. Chile: Provisions to Non-Performing Loans



Source: SBIF and author's calculations.

Figure 4. Chile: Real GDP, Comestic Credit and Provisions, Percent Deviation from HP Trend



Sources: SBIF and author’s calculations.

A more rigorous analysis using an vector error correction model (VECM) reinforces the results of the simple filter analysis (Table 3). The VECM analysis was performed using quarterly data on real GDP, domestic credit, and provisions for the period March 1998—June 2010. In the long run, real GDP exhibits contemporaneous positive correlation with real credit and negative correlation with provisions. In the short-run, however, changes in provisions have a negligible role for explaining real GDP and credit growth. In contrast, provisions are mainly driven by past credit growth. Since provisions do not appear to drive the credit cycle, smoothing them by imposing dynamic provisions may not have a major impact on procyclicality. This conclusion appears supported by the failure of dynamic provisions to reduce procyclicality in the few countries that have implemented them. Spain experienced rapid credit growth and a housing price bubble since provisions play only marginal impact on credit growth (Wood, 2009, and Fernandez de Lis and García-Herrero, 2010).

VI. CONCLUSIONS

At the policy level, the case for regulatory dynamic provisions have been advanced on the grounds that they help reducing the risk of bank insolvency and dampening credit procyclicality. In the case of the Chile the data appears to partly validate these claims.[6]

A simulation analysis suggests that under the Spanish dynamic provisions rule provision buffers against losses would be higher compared to those accumulated under current practices. The analysis also suggests that calibration based on historical data may not be adequate to deal with the presence of fat-tails in realized loan losses. Implementing dynamic provisions, therefore, requires a careful calibration of the regulatory model and stress testing loan-loss internal models.[7]

Dynamic provision rules appear not to dampen procyclicality in Chile. Results from a VECM analysis indicate that the credit cycle does not respond to the level of or changes in aggregate provisions. In light of this result, it may be worth exploring other measures to address procyclicality. Two examples of these measures include countercyclical capital requirements, as proposed by the Basel Committee on Banking Supervision (2010a and b), or the countercyclical provision rule introduced in Peru in 2008. The Basel countercyclical capital requirements suggest that the build up and release of additional capital buffers should be conditioned on deviations of credit to GDP ratio from its long-run trend. The Peruvian rule, contrary to standard dynamic provision rules, requires banks to accumulate countercyclical provisions when GDP growth exceeds potential. Both measures, by tying up capital or provision accumulations to cyclical indicators, could be more effective for reducing procyclicality.[8]

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[6] The discussion does not address the interaction between monetary policy and the provisioning regime. For instance, a valid question is how different provisioning schemes perform under different monetary regimes, such as inflation targeting.

[7] Besides parameter calibration, the successful implementation of a dynamic provisions scheme requires addressing several issues like the estimation of long-run expected losses and the tax and accounting treatment of reserves (Mann and Michael, 2000).

[8] See Chan-Lau, (2011) for a discussion of how different tools can reduce procyclicality in Latin America. Another policy option worth analyzing is whether a simple provisioning regime demanding higher ex-ante provisions, could be more robust than dynamic provisioning and easier to implement.

Table 3. Vector Error Correction Model for Real GDP, Credit Growth, and Provisions

Cointegrating equation				
Real GDP, 1 lag		1	n.a.	
Real credit, 1 lag		-0.646499	[-30.2600]	
Provisions, 1 lag		0.18645	[10.4800]	
Constant		-9.803183	n.a.	
Error correction equations		Real GDP	Real Credit	Provisions
Cointegrating equation		0.430*	0.902*	-0.999*
		[3.247]	[2.708]	[-3.478]
First Difference				
Log of real GDP,	lag1	-0.442	-0.784	0.778
		[-1.749]	[-1.234]	[1.421]
	lag 2	-0.898*	0.141	0.742
		[-4.201]	[0.262]	[1.598]
	lag 3	-0.445*	-0.583	0.248
		[-2.373]	[-1.236]	[0.609]
	lag 4	-0.556*	-0.161	0.437
		[-2.805]	[-0.322]	[1.017]
Log of real credit,	lag1	0.250*	0.563*	-0.484*
		[2.773]	[2.484]	[-2.476]
	lag 2	0.29388*	0.834054*	-0.349
		[3.034]	[3.424]	[-1.663]
	lag 3	0.083	0.554*	-0.017
		[0.868]	[2.292]	[-0.083]
	lag 4	0.069	0.431	-0.005
		[0.805]	[1.996]	[-0.027]
Log of provisions,	lag1	-0.025	0.059	0.201
		[-0.366]	[0.350]	[1.370]
	lag 2	-0.006	0.069	0.026
		[-0.082]	[0.386]	[0.169]
	lag 3	-0.009	0.106	-0.047
		[-0.129]	[0.609]	[-0.312]
	lag 4	0.022	0.049	0.154
		[0.329]	[0.295]	[1.081]
Constant		0.020	-0.009	-0.010
		[4.887]	[-0.865]	[-1.111]
R-squared		0.502	0.555	0.823
Adj. R-squared		0.287	0.362	0.746
F-statistic		2.330	2.877	10.699
Log likelihood		149.604	109.025	115.537
Akaike AIC		-6.164	-4.319	-4.615
Schwarz SC		-5.596	-3.752	-4.048

* indicates coefficient is statistically significant at the 5 percent confidence level.
Source: Central Bank of Chile and staff calculations.

References

Basel Committee on Banking Supervision, 2010a, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (Basel: BIS).

__________, 2010b, *Guidance for National Authorities Operating the Countercyclical Capital Buffer* (Basel: BIS).

Bikker, J.A., and P.A.J. Metzemakers, 2005, "Bank Provisioning Behaviour and Procyclicality," *Journal of International Financial Markets, Institutions and Money*, Vol. 15, No. 2, pp. 141–157.

Balla, E., and A. McKenna, 2009, "Dynamic Provisioning: A Countercyclical Tool for Loan Loss Reserves," *Economic Quarterly*, Vol. 95, No. 4, pp. 383–418.

Burroni, M., M. Quagliariello, E. Sabatini, and V. Tola, 2009, "Dynamic Provisioning: Rationale, Functioning, and Prudential Treatment," Occasional Paper No. 57, Banca D'Italia (Rome).

Brunnermeier, M., A. Crockett,C. Goodhart, A. Persaud, and H.-S. Shin, 2009, *The Fundamental Principles of Financial Regulation*, Geneva Report on the World Economy, Vol. 11.

Borio, C., C. Furfine, and P. Lowe, 2001, "Procyclicality of the Financial System and Financial Stability: Issues and Policy Options," in *Marrying the Macro- and Micro-Prudential Dimensions of Financial Stability*, BIS Papers No.1, pp. 1–57. (Basel).

Chan-Lau, J.A., 2008, "The Globalization of Finance and its Implications for Financial Stability: An Overview of the Issues," *International Journal of Banking, Accounting, and Finance*, Vol. 1, No. 1, pp. 3–29.

__________, 2011, "Leaning against the Wind in Latin America: Capital Requirements, Leverage Ratios, Countercyclical Capital Buffers and Dynamic Provisions," mimeo, Washington, DC.

FASB and IASB, 2009, "Spanish Provisions Under IFRS," Information for Observers, IASB/FASB Meeting, March (London).

Fernández de Lis, S., J. Martínez Pagés, and J. Saurina, 2000, "Credit Growth, Problem Loans and Credit Risk Provisioning in Spain," Banco de España, Documento de Trabajo No. 0018 (Madrid).

__________, and A. Garcia-Herrero, 2010, "Dynamic Provisioning: Some Lessons from Existing Experiences," Working Paper No. 218, Asian Development Bank Institute (Manila).

Fillat, J.L., and J. Montoriol-Garriga, 2010, "Addressing the Pro-Cyclicality of Capital Requirements with a Dynamic Loan Loss Provision System," Working Paper No. QAU10-4, Federal Reserve Bank of Boston.

Gordy, M., and B. Howells, 2006, "Procyclicality in Basel II: Can We Treat the Disease Without Killing the Patient?" *Journal of Financial Intermediation*, vol. 15, No. 2, pp. 397– 417.

Mann, F., and I. Michael, 2002, "Dynamic Provisioning: Issues and Application," *Financial Stability Review*, pp. 128–136, December (London: Bank of England).

Plantin, G., H. Sapra, and H. Shin, 2008, "Marking to market: Panacea or Pandora's Box?" *Journal of Accounting Research*, Vol. 46, No. 2, pp. 435–60.

Poveda, R., 2000, "La Reforma del Sistema de Provisiones de Insolvencia," *Boletín Económico*, pp. 73–91, Banco de España, Enero (Madrid).

Ryan, S. G., 2007, *Financial Instruments and Institutions. Accounting and Disclosure Rules*, 2nd edition (New York: John Wiley).

Saurina, J., 2009, "Loan Loss Provisions in Spain. A Working MacroPrudential Tool," *Revista de Estabilidad Financiera*, No. 17, pp. 9– 26 (Madrid: Bank of Spain).

Sunley, E., 2003, "Corporate Income Tax Treatment of Loan-Loss Reserves, "Chapter 9 in P. Honohan, editor, *Taxation of Financial Intermediation: Theory and Practice for Emerging Economies* (Washington: International Bank for Reconstruction and Development and Oxford University Press).

Wezel, T., 2010, "Dynamic Loan Loss Provisions in Uruguay: Properties, Shock Absorption Capacity and Simulations Using Alternative Formulas," IMF Working Paper No. 10/125 (Washington: International Monetary Fund).

Wood, D., 2009, "Critics Attack Dynamic Provisioning Following Spanish Bank Results," *Risk*, October.