Taking the Mystery out of Loan Stress Testing

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  - Wealth Advisory
  - Outsourcing
  - Audit, Tax, and Consulting
- 3,600 employees
- Offices coast to coast
- Serve more than 1,100 financial institutions

Investment advisory services are offered through CliftonLarsonAllen Wealth Advisors, LLC.

Speaker Introductions

- **Thomas Danielson, CPA**
  Tom is a principal with CliftonLarsonAllen and specializes in providing services to financial institutions. He has more than 30 years of experience providing audit, tax, and consulting services.

- **Lee Koch, CRC**
  Lee serves as a consulting manager in CliftonLarsonAllen's financial institutions group. To that role he brings more than 20 years of combined experience in banking and related consulting services with a current emphasis on loan review.

Agenda

This session will cover:

- **Loan portfolios** – methods for evaluating risk, including analyzing loan vintages, migration analysis, loss severity, probability of default, and loss given default
- **Individual loans** – measuring the impact of rising interest rates on a borrower's ability to pay and identifying and modeling key performance indicators for various loan types

Stress Testing

- Willingness to honestly evaluate unpleasant events
- Plans to deal with individual problem credits
- Board of directors activity managing concentrations
- Contingency plans for widespread loan problems
  - Sources of capital
  - Dealing with regulators
  - Liquidity planning
- Stress test individual loans
- Stress test your loan portfolio

Stress Testing of Portfolio

- Drastic declines in collateral values drop more than we want to admit
  - Ag crisis in 1980's
  - Energy crisis
  - Dot com bubble
  - Great recession
    - ◊ Home values
    - ◊ Commercial property
    - ◊ Land development

Stress Testing Individual Loans

- Starts by admitting that bad things happen
  - Changes in market
  - Changes in interest rates
  - Death, disability or divorce
  - Disagreements among owners
  - Loss of key employees
  - Loss of key customers or suppliers
  - Unpredictable events such as fire, flood, earthquake, hurricane or other disaster
- Finding the breaking point
- Varies depending on type of loan

Stress Testing Rental Real Estate

- Items to consider related to stress testing rental real estate
- Vacancy rate
- Rental rate
- Interest rate
- Market conditions
- How long can the owner support the loan if cash flow declines
- Estimate of change in market value of the property if cash flow declines

Stress Testing Commercial Loans

- Stress testing commercial loans
- Sensitivity to:
  - Declines in sales or gross profit
  - Increase in interest rates
- Willingness to cut expenses
  - How much?
  - How soon?
- Collection of accounts receivable
- Ability to delay payments to suppliers
- Cash reserves/ability and willingness of owners to support business

Stress Testing of Ag Loans

- Breakeven analysis
  - Production levels
  - Commodity pricing
  - Input costs
- Quality of borrower financial reporting
- Marketing effectiveness
- Historical earned increase in net worth
- Bank's willingness to allow carryover debt/loan additional funds
- Trends in land and equipment values

Methods for Stress Testing Loan Portfolio

- Concentrations
- Loss Severity
- Loan Vintages
- Migration Analysis
- Trends

Concentrations

- How much exposure does the bank have to a particular type of loan?
- Are concentrations actively monitored and managed?
- Major categories
- Subcategories

Commercial Real Estate Concentrations

- 12/6/2006 Interagency guidance on CRE concentrations
- Institutions should perform ongoing risk assessments to identify CRE concentrations
- Greater supervisory oversight if:
  - Construction and land development loans limited to 100% of total risk-based capital
  - Total CRE limited to 300% of total risk-based capital
- Exceeding the supervisory limits requires that the financial institution have enhanced risk management systems

Interagency Guidance
Credit Risk Review Function

A strong credit risk review function is critical for an institution's self-assessment of emerging risks. An effective, accurate, and timely risk-rating system provides a foundation for the institution's credit risk review function to assess credit quality and, ultimately, to identify problem loans. Risk ratings should be risk sensitive, objective, and appropriate for the types of CRE loans underwritten by the institution. Further, risk ratings should be reviewed regularly for appropriateness.

Loss Severity

- Loss severity refers to the percentage of principal loss incurred if a loan defaults.
- Very common in mortgage-backed securities, residential real estate and consumer installment lending.
- It is increasingly popular in other types of lending

Loan Vintages

- Loans originated during certain years have caused higher level of problems and losses.
- As these trends become apparent loan reviewers should concentrate on loans made during the bad years.
- Be aware of:
  - Developing asset valuation bubbles
  - Rapid growth of a loan type
  - Changes in underwriting standards
- Perform analysis of past due loans and defaulted loans.

CMBS Loan Vintages and Loss Severity

Vintage	Loan Count	Original Loan Balance ($Mil.)	% of Total	Total Losses ($ Mil.)	Average Loss Severity (%)	Average Resolution Time (months)
1996	4	$ 16.50	0.2	$ 10.60	64.0	32.3
1997	13	41.10	0.5	16.70	40.7	20.2
1998	20	135.70	1.7	74.20	54.7	29.7
1999	51	228.40	2.8	109.90	48.1	21.1
2000	63	314.40	3.8	128.00	40.7	19.8
2001	91	411.10	5.0	176.90	43.0	15.6
2002	35	282.10	3.4	148.60	52.7	12.2
2003	24	166.20	2.0	56.50	34.0	16.9
2004	57	494.20	6.0	249.20	50.4	22.0
2005	124	1,202.70	14.7	539.70	44.9	16.2
2006	193	1,892.10	23.1	949.70	50.2	21.8
2007	268	2,958.10	36.1	1,549.10	52.4	21.7
2008	8	54.20	0.7	33.90	62.6	22.0
Totals	951	$ 8,196.90	100.0	$ 4,043.00	49.3	20.3

Source: Fitch Ratings U.S. CMBS Loss Study: 2011

Loss Migration

- Loss migration looks at the movement of loans between loan classifications over time.
- An example from non-agency residential mortgage-backed securities
- Projected Lifetime Default As Percentage of Remaining Balance

Current	30-59 DQ	60-89 DQ	90+ DQ	Foreclosure	REO	Total
1.96%	57%	77%	90%	100%	100%	5.4%

Loss Severity
39%

Trends

- How are conditions changing?
  - Better?
  - Worse?
  - Stable?
  - Which industries?
  - Which geographical areas?
  - Economy
  - Collateral values
  - Political

Stress Testing at the Portfolio Level

- Attempt to measure risk exposure from various loan types
- Recessions are inevitable, but timing can't be predicted
- Defaults will rise with a recession
- Loss severity will increase with recession
- We have historical information on worst case scenarios
- Attempt to measure bank's resilience to downturns

Portfolio Stress Testing

Commercial Loan Possible Remaining Losses

Loan Vintage	Loan Seasoning	Loan Balance	Worst Case Cumulative Default Rate	Defaults To Date	Worst Case Remaining Defaults	Loss Severity %	Possible Remaining Losses
2012	0-12 Months	10,000,000	22%	0%	22%	45%	990,000
2011	1 Year	9,000,000	22%	1%	21%	45%	850,500
2010	2 Years	8,000,000	22%	6%	16%	45%	576,000
2009	3 Years	5,000,000	22%	8%	14%	45%	315,000
2008	4 Years	4,000,000	22%	10%	12%	45%	216,000
2007	5 Years	12,000,000	22%	12%	10%	45%	540,000
2006	6 Years	6,000,000	12%	4%	8%	35%	168,000
2005	7 and beyond	4,000,000	6%	2%	4%	25%	40,000
		58,000,000					3,695,500

Portfolio Stress Testing

Timing of Losses

Loan Vintage	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
2014	0%	0%	5%	15%	30%	30%	20%
2013	0%	5%	15%	30%	30%	20%	
2012	5%	15%	30%	30%	20%		
2011	20%	30%	30%	20%			
2010	20%	30%	30%	20%			
2009	20%	30%	30%	20%			
2008	20%	30%	30%	20%			
2007	20%	30%	30%	20%			

Portfolio Stress Testing

Loan Losses By Year

Loan Vintage	Possible Remaining Losses	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
2014	990,000	-	-	49,500	148,500	297,000	297,000	198,000
2013	850,500	-	42,525	127,575	255,150	255,150	170,100	-
2012	576,000	28,800	86,400	172,800	172,800	115,200	-	-
2011	315,000	63,000	94,500	94,500	63,000	-	-	-
2010	216,000	43,200	64,800	64,800	43,200	-	-	-
2009	540,000	108,000	162,000	162,000	108,000	-	-	-
2008	168,000	33,600	50,400	50,400	33,600	-	-	-
2007	40,000	8,000	12,000	12,000	8,000	-	-	-
	3,695,500	284,600	512,625	733,575	832,250	667,350	467,100	198,000

Portfolio Stress Testing

Loan Type	Loan Balances	Correlation / Covariance	Normal Loan Loss %	Worst Case Losses	Year 1	Year 2	Year 3	Year 4	Year 5
Commercial Real Estate	$ 58,000,000	100%	0.50%	$ 3,695,500	$ 284,600	$ 512,625	$ 733,575	$ 832,250	$ 667,350
Construction and Development	10,000,000	100%	0.75%	2,500,000	125,000	250,000	625,000	625,000	625,000
Agricultural	5,000,000	0%	0.50%	450,000	25,000	25,000	25,000	25,000	25,000
Residential Real Estate	12,000,000	50%	0.35%	660,000	16,500	33,000	82,500	82,500	82,500
C&I	45,000,000	100%	1.00%	4,500,000	225,000	450,000	1,125,000	1,125,000	1,125,000
Consumer	15,000,000	0%	1.25%	1,125,000	187,500	187,500	187,500	187,500	187,500
Other	3,000,000	0%	1.25%	225,000	37,500	37,500	37,500	37,500	37,500
	$ 148,000,000			$ 13,155,500	$ 901,100	$ 1,495,625	$2,816,075	$2,914,750	$2,749,850

Bank Core Pre-tax Income	1.25%
Total Bank Assets	$ 225,000,000
Normal ALLL	1.50%
Minimum ALLL	2 Years Charge-offs

	Year 1	Year 2	Year 3	Year 4	Year 5
Projected Core Earnings	$ 2,812,500	$ 2,812,500	$2,812,500	$2,812,500	$2,812,500
Estimated Provision	(1,672,350)	(4,136,525)	(3,013,425)	(2,584,950)	-
Added Expenses/Lost Interest	(562,500)	(562,500)	(562,500)	(337,500)	(225,000)
Projected Pre-tax Earnings	$ 577,650	$(1,886,525)	$ (763,425)	$ (109,950)	$2,587,500

Capital Matters

- Will the bank need additional capital?
  - Sources
  - Cost
  - Resources of existing shareholders
- Impact on dividends to holding company
- Holding company cash needs
- Shareholder cash needs
  - Taxes if S Corporation
  - Living expenses

Questions?

Thank you!

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