Nebraska Bankers Association

Asset Liability Management

Presented by Wilary Winn

Frank Wilary, Principal

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Wilary Winn LLC

Today’s Presenter

Frank Wilary – *Principal*

Mr. Wilary co-founded Wilary Winn in 2003 and has over twenty years of diversified experience in the financial services industry. His areas of expertise include asset-liability management, capital markets, derivatives, information systems and valuation of illiquid financial instruments. Frank’s primary responsibility is to lead the research, development and implementation of Wilary Winn's new business lines. He works to ensure that new products and services meet our firms' high standards and makes the critical determination of whether to buy or build valuation software and how to best utilize the system selected.

Asset Liability Management

Presentation Objective

- Begin with a balance sheet, identify inherent risks, and evaluate business strategies for optimization of risk and return
  - Increase leverage
  - Change loan portfolio mix
- Analyze business strategies under various interest rate scenarios and under adverse economic scenarios

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Asset Liability Management

Presentation Background

- Inspired by client questions – how do we optimize our balance sheet between risk and return?
  - Wilary Winn evolved our ALM processes to analyze interest rate risk and cohort level credit risk on an integrated basis
  - Wilary Winn learned to evaluate business strategies under base case and adverse economic situations
- Goal of providing solutions
- Detail our analytic process – reflect the criteria and methodologies used to evaluate proposed balance sheet changes.

Asset Liability Management

Today's Topics

- ALM background
- Balance sheet overview
- Credit loss modeling
- Business strategy evaluation / what-if analysis
- Capital stress testing
- Concentration risk analysis
- CECL
- Risk-based capital

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ALM Background

Asset Liability Management

Asset and liability management (ALM) is the practice of managing risks that arise due to mismatches between assets and liabilities and earning an adequate return.

ALM considers interest rate risk, liquidity risk and credit risk which ideally is measured on an integrated basis.

Of these risks, credit risk is the most critical because losses incurred on loans and investments have been key factors in banking crises and failures.

ALM Background

Advantages of incorporating credit loss modeling within the framework of ALM

- Risk-based pricing – adjust yield requirements based upon expected losses at the loan / cohort level based on predictive inputs
- Loss exposure analysis – stress losses based upon changes in economic environment
- Capital stress testing – determine capital to put at risk in pursuit of return and set concentration limits accordingly

Balance Sheet Composition

Balance Sheet - Overall

Asset / Liability Category	Balance	% of Assets
Total Assets	1,250,000,000	100.00%
Total Liabilities	1,137,500,000	91.00%
Equity	112,500,000	9.00%

Balance Sheet Composition

Cash Position & Investment Portfolio

Asset / Liability Category	Balance	% of Assets
Cash and Equivalents	75,000,000	6.00%
Securities:		
Agency MBS	50,000,000	4.00%
Agency CMO	25,000,000	2.00%
Municipal Securities	75,000,000	6.00%
Total Securities	150,000,000	12.00%

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Balance Sheet Composition

Loan Portfolio

Asset / Liability Category	Balance	% of Assets
Loans:		
First Mortgage Loans	450,000,000	36.00%
Home Equity Loans	50,000,000	4.00%
HELOC	50,000,000	4.00%
Construction Loans	75,000,000	6.00%
Agricultural Land Loans	100,000,000	8.00%
Agricultural Term and LOC	125,000,000	10.00%
CRE - Retail Buildings	100,000,000	8.00%
Credit Card	25,000,000	2.00%
Other Consumer	25,000,000	2.00%
Total Loans:	1,000,000,000	80.00%

Balance Sheet Composition

Liabilities & Capital

Asset / Liability Category	Balance	% of Assets
Non-Maturity Deposits		
Checking Accounts	275,000,000	22.00%
Savings Accounts	175,000,000	14.00%
Money Market Accounts	300,000,000	24.00%
Total Non-Maturity Deposits	750,000,000	60.00%
Certificates of Deposit	325,000,000	26.00%
Other Borrowings	37,500,000	3.00%
Short-term Borrowings		
Other Liabilities	25,000,000	2.00%
Total Liabilities	**1,137,500,000**	**91.00%**
Equity	**112,500,000**	**9.00%**

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ALM Objectives

For purposes of this presentation we are assuming that a bank wants to maximize its earnings while maintaining a predetermined capitalization level even under adverse economic conditions.

Asset Liability Management

Summary Profile and Objective

44% real estate loans – 36% first lien

32% commercial loans

60% non-maturity deposits

9% Tier 1 Leverage ratio

Goal is to keep Tier 1 Leverage ratio above 7.50% in the current economic environment and 6.00% in an adverse economic environment

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Asset Liability Management

Key ALM Valuation Inputs:

- Conditional Repayment Rate (CRR)
- Conditional Default Rate (CDR)
- Conditional Prepayment Rate (CPR = CRR + CDR)
- Loss Severity
- Discount Rate

By developing potential credit losses explicitly with default and loss severity assumptions at the loan or cohort level, the main objectives of the current expected credit loss model (“CECL”) are met.

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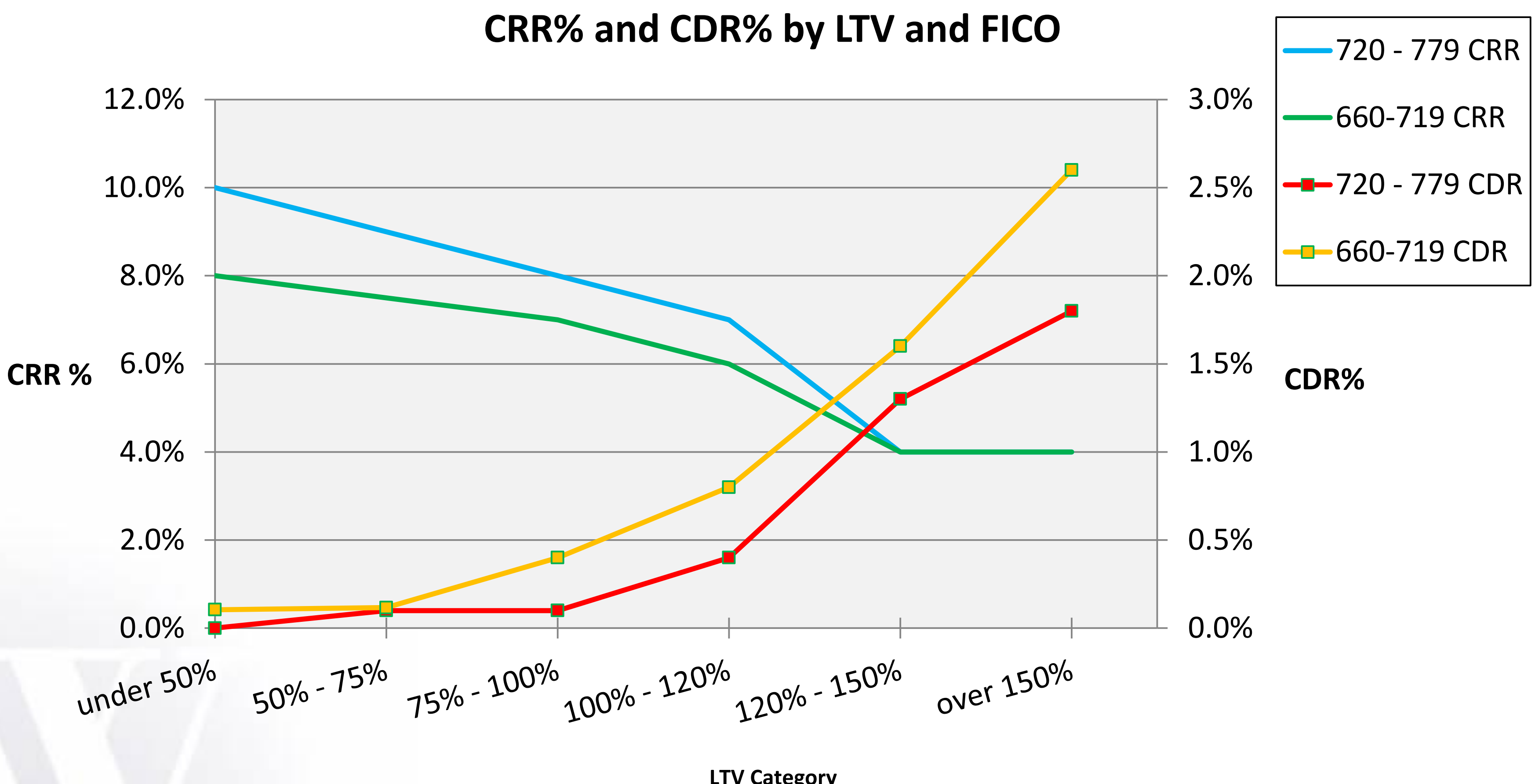
Estimating Credit Losses

Modeling should be based on type of loan and credit attributes

- Commercial loans
  - Risk rating
  - Debt service coverage
  - NAICS code
- Residential real estate
  - FICO score range
  - Loan-to-value or CLTV

Estimating Credit Losses



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Estimating Credit Losses

SBA Default Rates by NAICS Code

Economic Variable	2007	2008	2009	2010	2011	2012
Bowling Centers	2.49	3.66	4.81	6.07	1.37	7.17
Car Washes	2.37	7.28	9.00	9.21	3.18	3.48
Gasoline Stations	2.57	4.14	6.55	7.55	3.83	4.04
Hotels and Motels	1.75	3.45	5.03	7.91	3.31	3.00
Machine Shops	1.22	3.59	4.09	3.29	2.03	1.32
Offices of Dentists	0.84	2.28	4.13	3.60	1.50	1.77
Offices of Lawyers	0.60	1.89	1.89	4.13	2.14	0.66
Veterinary Services	0.23	0.70	1.95	0.63	1.15	0.41

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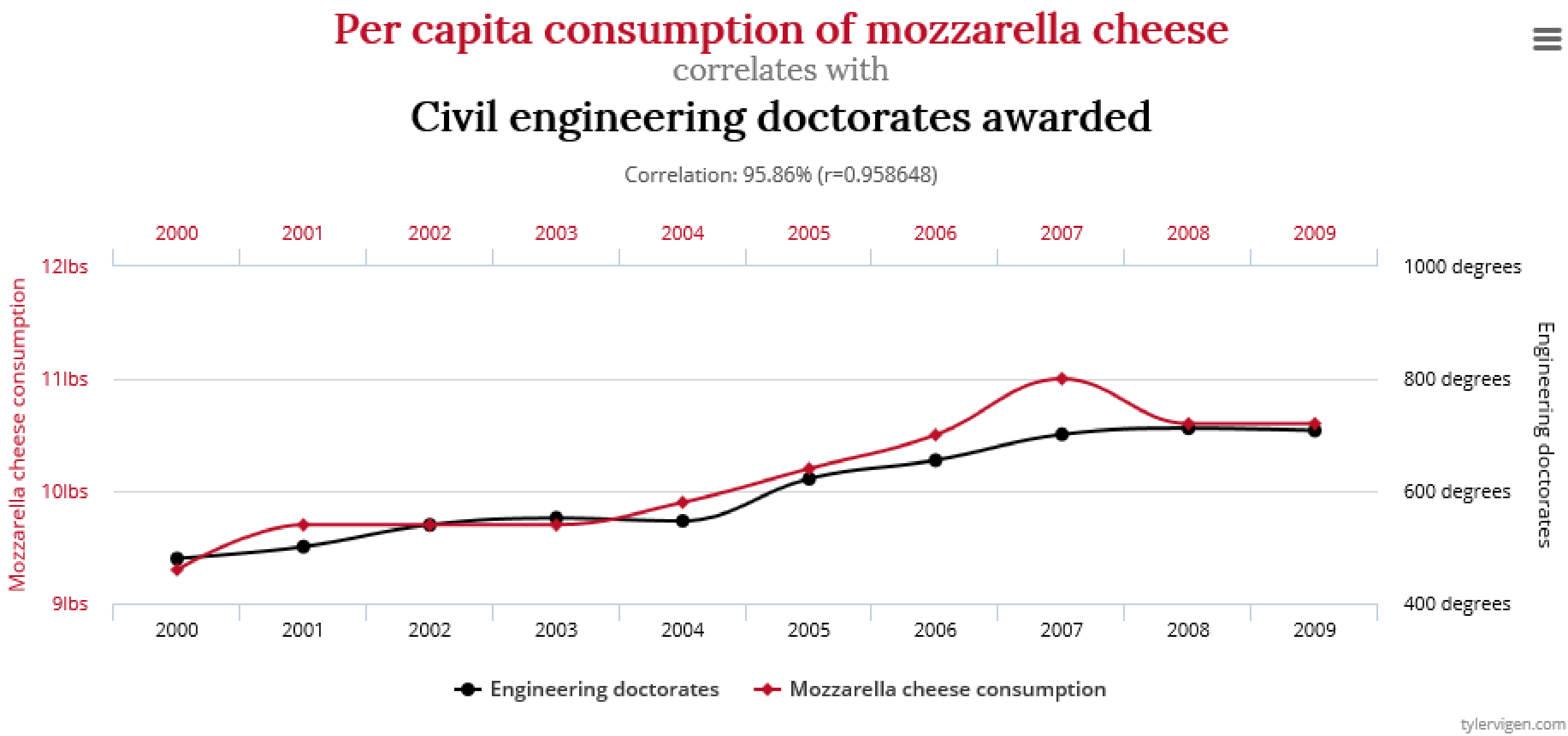
Predictive Inputs

Correlation Coefficients - National Delinquent 30-89 Days Loans & Economic Variable

Economic Variable	1-4 Family	Construction & Land Development	Multifamily	Commercial Real Estate	Farm Loans	Commercial & Industrial
Real GDP	0.41	0.53	0.41	0.36	0.19	0.22
Real Disposable Income	0.19	0.16	0.09	0.12	0.04	0.06
Unemployment Rate	**0.87**	**0.62**	**0.65**	**0.65**	0.29	0.15
CPI	0.34	0.24	0.24	0.23	0.02	0.14
5-Yr Treasury	0.67	0.28	0.25	0.21	0.35	0.55
BBB Corporate Yield	0.11	0.41	0.32	0.37	0.51	**0.81**
House Price Index	0.6	0.36	0.35	0.62	0.48	0.42
Commercial Real Estate Index	0.01	0.04	0.13	0.42	0.55	0.47

Correlation is not Causation



Source: Spurious Media LLC

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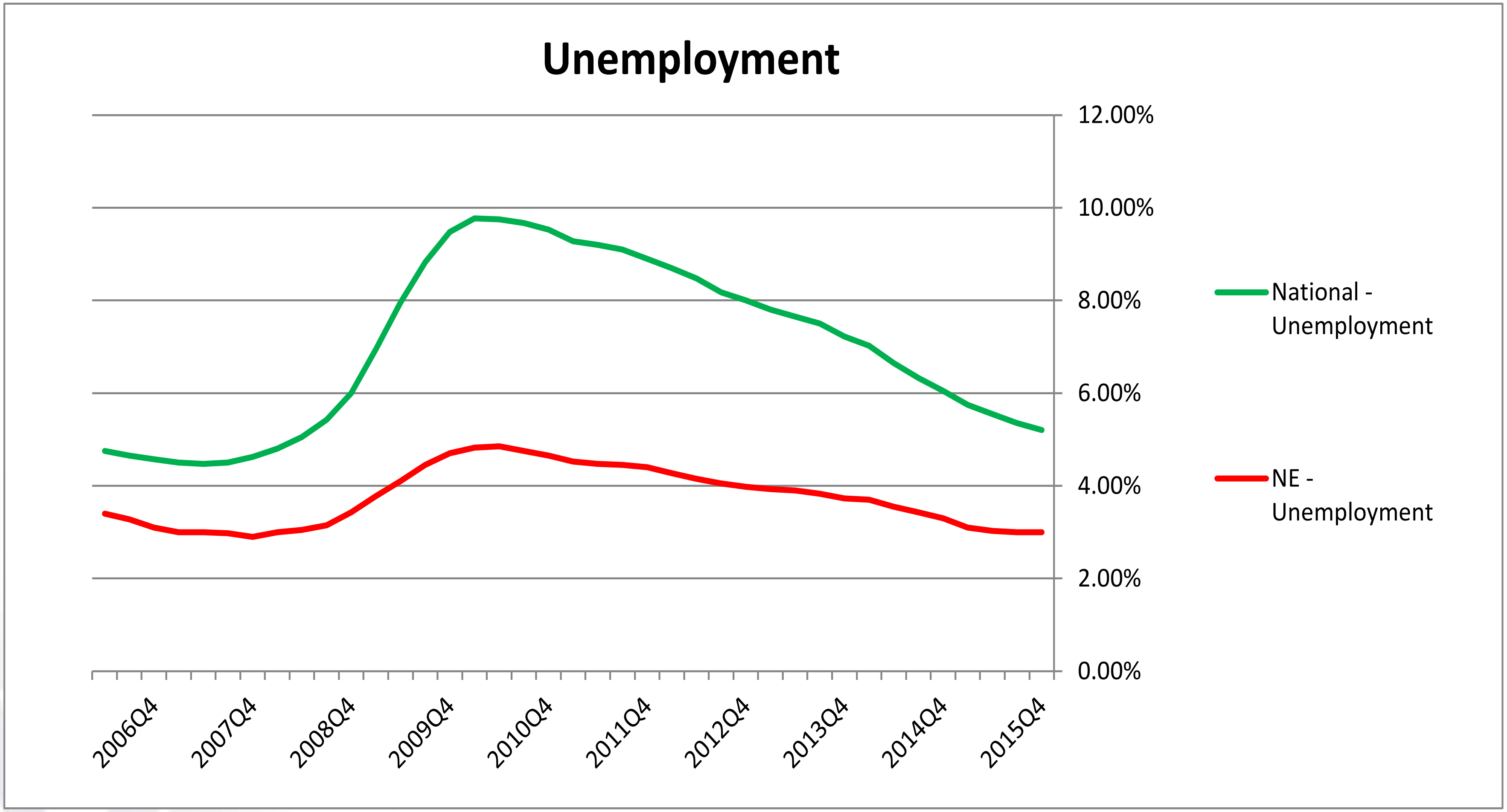
Predictive Inputs



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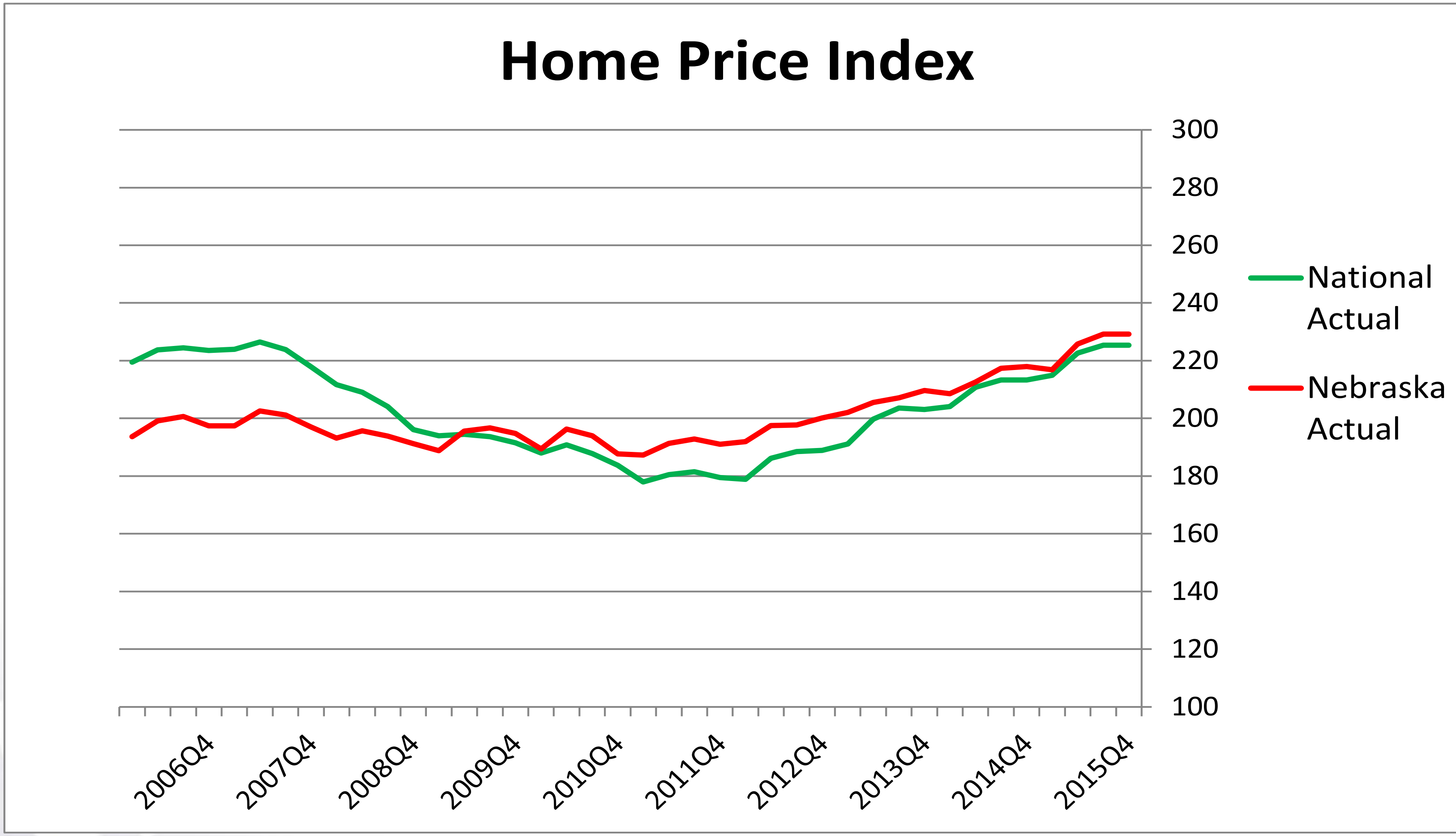
Predictive Inputs



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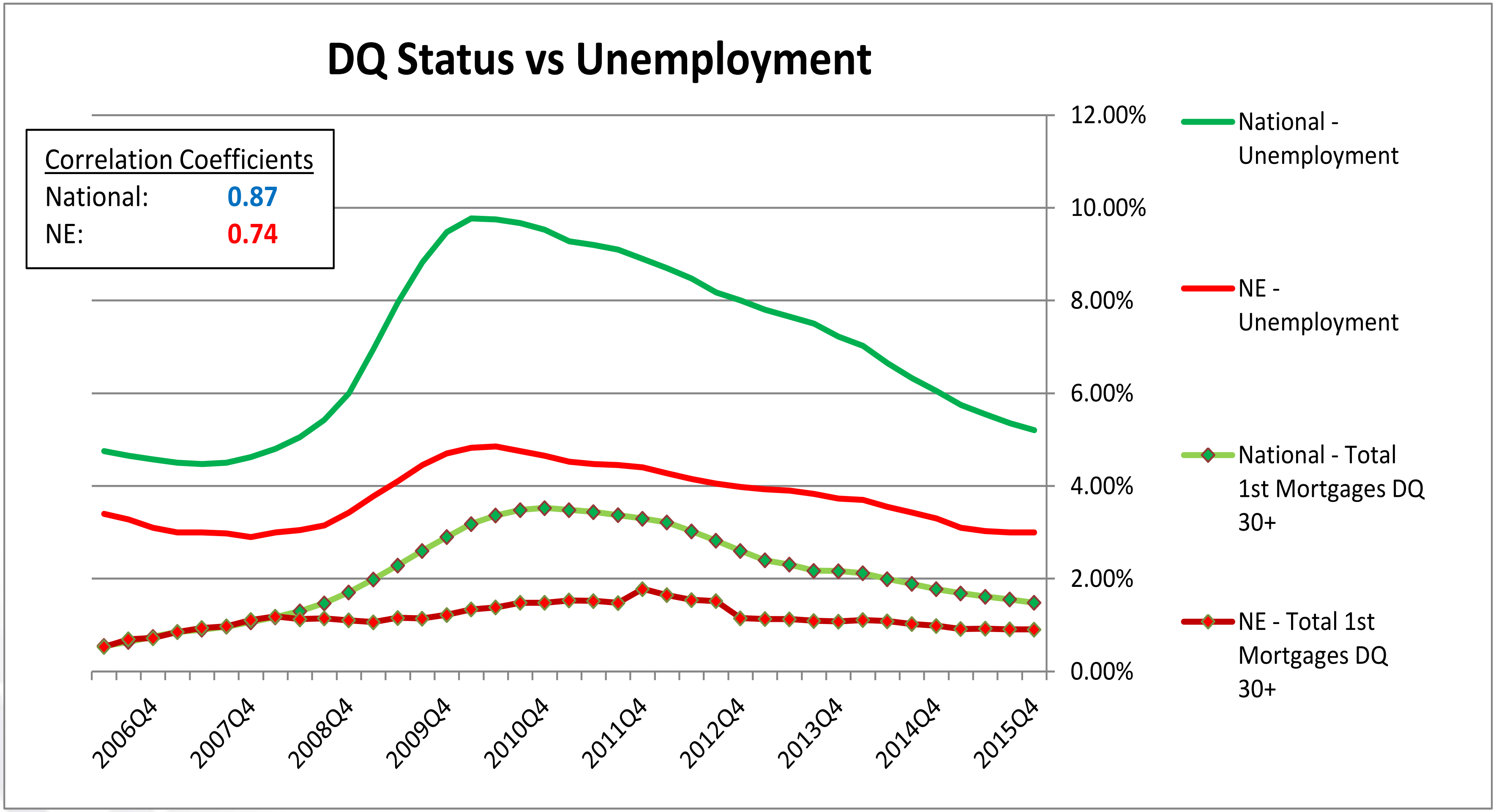
Predictive Inputs



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ALM Profile

Net Interest Income Profile

Net Interest Income Profile					
Category	**-100**	**Base**	**+100**	**+200**	**+300**
Investments	2,155,050	2,874,900	3,550,350	3,968,925	4,297,200
Loans	40,013,862	42,030,629	44,308,868	46,568,402	48,861,324
Interest Income	**42,168,912**	**44,905,529**	**47,859,218**	**50,537,327**	**53,158,524**
Non-Maturing Deposits	1,661,897	2,993,253	4,983,866	6,974,498	8,965,111
Certificates of Deposit	3,983,200	4,297,696	4,630,496	4,963,296	5,295,680
Borrowings	303,098	312,161	597,161	882,161	1,167,161
Interest Expense	**5,948,195**	**7,603,110**	**10,211,523**	**12,819,955**	**15,427,952**
Net Interest Income	**36,220,718**	**37,302,420**	**37,647,695**	**37,717,372**	**37,730,573**
NII Volatility	**-2.90%**		**0.93%**	**1.11%**	**1.15%**
ROA	**0.65%**	**0.73%**	**0.76%**	**0.77%**	**0.77%**
ROE	**7.20%**	**8.16%**	**8.46%**	**8.53%**	**8.54%**
NIM	**3.15%**	**3.24%**	**3.27%**	**3.28%**	**3.28%**
Yield on Investments	**1.44%**	**1.92%**	**2.37%**	**2.65%**	**2.86%**
Yield on Loans	**4.00%**	**4.20%**	**4.43%**	**4.66%**	**4.89%**
Cost of Funds	**0.53%**	**0.68%**	**0.92%**	**1.15%**	**1.39%**

ALM Profile

Net Economic Value Profile

Economic Value of Equity Profile					
Category	**-100**	**Base**	**+100**	**+200**	**+300**
Cash	75,000,000	75,000,000	75,000,000	75,000,000	75,000,000
Investments	154,880,000	152,517,500	148,782,500	143,902,500	138,612,500
Loans	996,769,500	976,012,000	948,802,000	922,982,000	898,302,000
Other Assets	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000
Total Assets	**1,251,649,500**	**1,228,529,500**	**1,197,584,500**	**1,166,884,500**	**1,136,914,500**
Non-Maturing Deposits	739,060,000	715,857,500	696,427,500	680,522,500	668,737,500
Certificates of Deposit	337,057,500	330,330,000	323,375,000	316,680,000	310,245,000
Borrowings	38,954,283	37,968,750	36,755,221	35,615,239	34,541,450
Other Liabilities	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000
Total Liabilities	**1,140,071,783**	**1,109,156,250**	**1,081,557,721**	**1,057,817,739**	**1,038,523,950**
Economic Value of Equity	**111,577,717**	**119,373,250**	**116,026,779**	**109,066,761**	**98,390,550**
EVE Volatility	**-6.53%**		**-2.80%**	**-8.63%**	**-17.58%**
EVE Ratio	**8.91%**	**9.72%**	**9.69%**	**9.35%**	**8.65%**

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Credit Exposure

Credit Losses (base and with economic stress)

Loan Category	Balance	WAC	% of Assets	% of Net Worth	Base Case Credit Losses %	Base Case Credit Losses $	Max Stress Credit Loss %	Max Stress Credit Loss $
First Mortgages	450,000,000	3.78%	36.00%	400.00%	1.15%	5,182,500	3.58%	16,107,500
Home Equity Loans	50,000,000	5.56%	4.00%	44.44%	2.13%	1,063,500	7.94%	3,969,750
HELOCs	50,000,000	3.75%	4.00%	44.44%	1.32%	660,500	4.97%	2,485,250
Construction Loans	75,000,000	4.17%	6.00%	66.67%	1.30%	975,750	4.13%	3,099,750
Agricultural Land Loans	100,000,000	4.13%	8.00%	88.89%	1.10%	1,101,000	2.63%	2,628,000
Agricultural Term and LOC	125,000,000	4.30%	10.00%	111.11%	0.88%	1,100,000	2.16%	2,695,000
CRE - Retail Buildings	100,000,000	4.18%	8.00%	88.89%	1.30%	1,300,000	3.33%	3,333,500
Credit Card	25,000,000	10.32%	2.00%	22.22%	2.68%	670,000	4.02%	1,005,000
Other Consumer	25,000,000	5.23%	2.00%	22.22%	2.02%	505,000	2.83%	707,000
Total Loans	**1,000,000,000**	**4.24%**	**80.00%**	**888.89%**	**1.26%**	**12,558,250**	**3.60%**	**36,030,750**

	Base Case	Max Stress
Current Leverage Ratio	**9.00%**	**9.00%**
Adjusted Leverage Ratio (Add back existing ALLL)	**9.60%**	**9.60%**
Leverage Ratio After Credit Losses	**8.60%**	**6.72%**
Target Leverage Ratio	7.50%	6.00%
	Pass	Pass

What-if Scenarios

Objectives of What-if Scenarios

- Strategic organizational initiatives
  - Annual budgeting
  - Loan and investment portfolio optimization
  - Leverage and growth strategies
  - Funding source optimization
  - Evaluation of risk-based pricing strategies
- Sensitivity analysis of modeling inputs
- Liquidity stress testing and cash flow monitoring
- Regulatory compliance

What-if Scenarios

Scenario Considerations

- Scenarios should be customized for the risk appetite of an organization
- Risks should be measured and analyzed on an integrated basis
  - Interest Rate
  - Credit
  - Concentration
  - Liquidity

What-if Scenarios

Process of Performing What-if Scenarios

- Identify issue or goal
- Recognize there are often many potential solutions leading to an iterative process
- Identify variables and range of adjustments
- Run multiple iterations
- Produce resulting analytics
- Decide on optimal solution

What-if Scenarios

What-if Scenarios Modeled

- Scenario 1 – leverage strategy
- Scenario 2 – change in loan mix

What-if Scenarios

Objectives of Scenario 1 – Leverage Strategy

- Analyze interest rate risk and credit risk under multiple economic environments
- Grow loan portfolio by $100 MM to increase NII and ROA
- Pass leverage stress test in base case economic conditions with 7.5% target
- Pass leverage stress test in max stress economic conditions with 6.0% target
- Minimize impact to ALM volatility profiles
- Use funding consisting of 50% organic growth and 50% borrowings

What-if Scenarios

Scenario 1 - Leverage Strategy								
Asset / Liability Category	**Balance**	**Scenario Changes**	**Balance**	**WAC**	**Base Case Credit Losses %**	**Base Case Credit Losses $**	**Max Stress Credit Loss %**	**Max Stress Credit Loss $**
First Mortgage Loans	450,000,000	30,000,000	480,000,000	3.78%	1.09%	5,230,500	3.40%	16,299,500
Low Risk	*350,000,000*	*30,000,000*	*380,000,000*	*3.68%*	*0.16%*	*608,000*	*0.64%*	*2,432,000*
Medium Risk	*75,000,000*	-	*75,000,000*	*4.06%*	*3.79%*	*2,842,500*	*11.37%*	*8,527,500*
High Risk	*25,000,000*	-	*25,000,000*	*4.35%*	*7.12%*	*1,780,000*	*21.36%*	*5,340,000*
Agricultural Land Loans	100,000,000	70,000,000	170,000,000	4.13%	1.13%	1,921,500	2.87%	4,887,000
Low Risk	*70,000,000*	*35,000,000*	*105,000,000*	*3.87%*	*0.02%*	*21,000*	*0.07%*	*73,500*
Medium Risk	*20,000,000*	*30,000,000*	*50,000,000*	*4.48%*	*1.35%*	*675,000*	*4.73%*	*2,362,500*
High Risk	*10,000,000*	*5,000,000*	*15,000,000*	*5.21%*	*8.17%*	*1,225,500*	*16.34%*	*2,451,000*
Total Assets	**1,250,000,000**	**100,000,000**	**1,350,000,000**	**3.73%**	**0.99%**	**13,426,750**	**2.85%**	**38,481,750**
Certificates of Deposit	325,000,000	50,000,000	375,000,000	1.28%				
Other Borrowings	37,500,000	50,000,000	87,500,000	0.76%				
Total Liabilities	**1,137,500,000**	**100,000,000**	**1,237,500,000**	**0.60%**				
Equity	**112,500,000**	**-**	**112,500,000**					
Equity Ratio	**9.00%**		**8.33%**					
Leverage Ratio After Lifetime Credit Losses					7.89%		6.04%	
Target Leverage Ratio					7.50%		6.00%	
					Pass		Pass	
Variance from Current Position								
Lifetime Credit Losses						**868,500**		**2,451,000**
Leverage Ratio After Lifetime Credit Losses						**-0.70%**		**-0.68%**

What-if Scenarios

Scenario 1 - Leverage Strategy

Net Interest Income Profile					
Category	-100	Base	+100	+200	+300
NII - Scenario	39,045,525	40,224,212	40,304,317	40,089,364	39,831,200
NII Volatility - Scenario	-2.93%		0.20%	-0.34%	-0.98%
NII - Base	36,220,718	37,302,420	37,647,695	37,717,372	37,730,573
NII Volatility - Base	-2.90%		0.93%	1.11%	1.15%
Variance from Current Position					
NII	2,824,807	2,921,792	2,656,621	2,371,992	2,100,627
NII Volatility	-0.03%		-0.73%	-1.45%	-2.12%
ROA	0.16%	0.16%	0.14%	0.12%	0.10%
NIM	-0.03%	-0.03%	-0.05%	-0.07%	-0.09%
Yield on Loans	-0.01%	-0.02%	-0.02%	-0.03%	-0.04%
Cost of Funds	0.04%	0.03%	0.05%	0.06%	0.08%

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What-if Scenarios

Scenario 1 - Leverage Strategy					
Economic Value of Equity Profile					
Category	-100	Base	+100	+200	+300
EVE - Scenario	112,298,174	120,085,250	116,304,818	109,205,775	98,671,284
EVE Volatility - Scenario	-6.48%		-2.57%	-8.52%	-17.34%
EVE Ratio - Scenario	8.31%	9.05%	9.00%	8.67%	8.04%
EVE - Base	111,577,717	119,373,250	116,026,779	109,066,761	98,390,550
EVE Volatility - Base	-6.53%		-2.80%	-8.63%	-17.58%
EVE Ratio - Base	8.91%	9.72%	9.69%	9.35%	8.65%
Variance from Current Position					
EVE	720,456	712,000	278,039	139,015	280,734
EVE Volatility	0.05%	0.00%	0.23%	0.12%	0.24%
EVE Ratio	-0.61%	-0.66%	-0.69%	-0.68%	-0.61%

What-if Scenarios

Scenario 1 – Increased Leverage Summary

	Current Performance		Scenario 1 - Leverage Strategy		Variance	
Profitability Metrics	**Base**	**+300**	**Base**	**+300**	**Base**	**+300**
NII	37,302,420	37,730,573	40,224,212	39,831,200	2,921,792	2,100,627
NII Volatility	-	1.15%	-	-0.98%	-	-2.12%
ROA	0.73%	0.77%	0.90%	0.87%	0.16%	0.10%
NIM	3.24%	3.28%	3.22%	3.19%	-0.03%	-0.09%
EVE	119,373,250	98,390,550	120,085,250	98,671,284	712,000	280,734
EVE Volatility	-	-17.58%	-	-17.83%	-	-0.25%
EVE Ratio	9.72%	8.65%	9.05%	8.04%	-0.66%	-0.61%
Credit Loss Metrics	**Base**	**Max Stress**	**Base**	**Max Stress**	**Base**	**Max Stress**
Credit Loss $	12,558,250	36,030,750	13,426,750	38,481,750	868,500	2,451,000
Credit Loss %	1.26%	3.60%	0.99%	2.85%	-0.26%	-0.75%
Leverage (after losses)	8.60%	6.72%	7.89%	6.04%	-0.70%	-0.68%

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What-if Scenarios

Objectives of Scenario 2 (Change in Loan Mix)

- Decrease concentration in fixed rate mortgages to mitigate interest rate risk, liquidity risk, and credit exposure
- Adjust loan mix to significantly improve credit exposure to max economic stress test
- Improve EVE volatility profile to decrease long-term interest rate risk in rising rate scenarios
- Minimize impact to net interest income

What-if Scenarios

Scenario 2 - Change in Loan Mix								
Asset / Liability Category	Balance	Scenario Changes	Balance	WAC	Base Case Credit Losses %	Base Case Credit Losses $	Max Stress Credit Loss %	Max Stress Credit Loss $
First Mortgage Loans	450,000,000	(100,000,000)	350,000,000	3.72%	0.52%	1,815,500	1.70%	5,958,500
Low Risk	*350,000,000*	*(30,000,000)*	*320,000,000*	3.68%	*0.16%*	*512,000*	*0.64%*	*2,048,000*
Medium Risk	*75,000,000*	*(50,000,000)*	*25,000,000*	4.06%	*3.79%*	*947,500*	*11.37%*	*2,842,500*
High Risk	*25,000,000*	*(20,000,000)*	*5,000,000*	4.35%	*7.12%*	*356,000*	*21.36%*	*1,068,000*
Agricultural Land Loans	100,000,000	50,000,000	150,000,000	4.08%	0.65%	969,500	1.85%	2,780,500
Low Risk	*70,000,000*	*35,000,000*	*105,000,000*	3.87%	*0.02%*	*21,000*	*0.07%*	*73,500*
Medium Risk	*20,000,000*	*20,000,000*	*40,000,000*	4.48%	*1.35%*	*540,000*	*4.73%*	*1,890,000*
High Risk	*10,000,000*	*(5,000,000)*	*5,000,000*	5.21%	*8.17%*	*408,500*	*16.34%*	*817,000*
Agricultural Term and LOC	125,000,000	50,000,000	175,000,000	4.27%	0.59%	1,035,000	1.67%	2,929,500
Low Risk	*87,500,000*	*35,000,000*	*122,500,000*	4.02%	*0.06%*	*73,500*	*0.21%*	*257,250*
Medium Risk	*25,000,000*	*20,000,000*	*45,000,000*	4.77%	*1.11%*	*499,500*	*3.89%*	*1,748,250*
High Risk	*12,500,000*	*(5,000,000)*	*7,500,000*	5.29%	*6.16%*	*462,000*	*12.32%*	*924,000*
Total Assets	**1,250,000,000**	**-**	**1,250,000,000**	**3.71%**	**0.72%**	**8,994,750**	**2.10%**	**26,268,750**
Total Liabilities	**1,137,500,000**	**-**	**1,137,500,000**	**0.62%**				
Equity	**112,500,000**	**-**	**112,500,000**					
Equity Ratio	**9.00%**		**9.00%**					
Leverage Ratio After Lifetime Credit Losses					8.88%		7.50%	
Target Leverage Ratio					7.50%		7.50%	
					Pass		Pass	
Variance from Current Position								
Lifetime Credit Losses						**(3,563,500)**		**(9,762,000)**
Leverage Ratio After Lifetime Credit Losses						**0.29%**		**0.78%**

What-if Scenarios

Scenario 2 - Change in Loan Mix					
Net Interest Income Profile					
Category	-100	Base	+100	+200	+300
NII - Scenario	35,695,996	37,063,643	37,695,157	38,035,767	38,325,875
NII Volatility - Scenario	-3.69%		1.70%	2.62%	3.41%
NII - Base	36,220,718	37,302,420	37,647,695	37,717,372	37,730,573
NII Volatility - Base	-2.90%		0.93%	1.11%	1.15%
Variance from Current Position					
NII	(524,722)	(238,777)	47,462	318,395	595,303
NII Volatility	-0.79%		0.78%	1.51%	2.26%
ROA	-0.04%	-0.02%	0.00%	0.03%	0.05%
NIM	-0.05%	-0.02%	0.00%	0.03%	0.05%
Yield on Loans	-0.05%	-0.02%	0.00%	0.03%	0.06%

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What-if Scenarios

Scenario 2 - Change in Loan Mix					
Economic Value of Equity Profile					
Category	-100	Base	+100	+200	+300
EVE - Scenario	114,652,217	124,732,750	124,561,279	120,536,261	112,635,050
EVE Volatility - Scenario	-8.08%		4.35%	0.97%	-5.64%
EVE Ratio - Scenario	9.14%	10.11%	10.33%	10.23%	9.78%
EVE - Base	111,577,717	119,373,250	116,026,779	109,066,761	98,390,550
EVE Volatility - Base	-6.53%		-2.80%	-8.63%	-17.58%
EVE Ratio - Base	8.91%	9.72%	9.69%	9.35%	8.65%
Variance from Current Position					
EVE	3,074,500	5,359,500	8,534,500	11,469,500	14,244,500
EVE Volatility	-1.55%	0.00%	7.15%	9.61%	11.93%
EVE Ratio	0.22%	0.39%	0.64%	0.88%	1.13%

What-if Scenarios

Scenario 2 – Change in Loan Mix Summary

	Current Performance		Scenario 2 - Change in Loan Mix		Variance	
Profitability Metrics	Base	+300	Base	+300	Base	+300
NII	37,302,420	37,730,573	37,063,643	38,325,875	(238,777)	595,303
NII Volatility	-	1.15%	-	3.41%	-	2.26%
ROA	0.73%	0.77%	0.72%	0.82%	-0.02%	0.05%
NIM	3.24%	3.28%	3.22%	3.33%	-0.02%	0.05%
EVE	119,373,250	98,390,550	124,732,750	112,635,050	5,359,500	14,244,500
EVE Volatility	-	-17.58%	-	-9.70%	-	7.88%
EVE Ratio	9.72%	8.65%	10.11%	9.78%	0.39%	1.13%
Credit Loss Metrics	Base	Max Stress	Base	Max Stress	Base	Max Stress
Credit Loss $	12,558,250	36,030,750	8,994,750	26,268,750	(3,563,500)	(9,762,000)
Credit Loss %	1.26%	3.60%	0.72%	2.10%	-0.54%	-1.50%
Leverage (after losses)	8.60%	6.72%	8.88%	7.50%	0.29%	0.78%

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What-if Scenarios

Modeling Methodology

- Instantaneous changes
  - Based on current characteristics of instruments in each category
  - New instruments are added based on current market characteristics
- Growth over-time
  - Align with budgeted annual growth
  - Model a range of growth rates
  - Incorporate account seasonality
- Process of iterative adjustments
  - Dynamic adjustments and results
  - Individually modeled scenarios through ALM software

Concentration Risk

Concentration Risk Policy Example

Account Type	Policy – % of Net Worth
First Mortgage Loans	<=350%
Home Equity Loans	<=150%
Commercial Real Estate	<=350%
Commercial Non-Real Estate	<=300%
Credit Cards	<=75%

Weaknesses?

Concentration Risk

Concentration Risk Policy Best Practices Example

Account Type	Policy – % of Net Worth
First Mortgage Loans:	
Prime	<=310%
Near Prime	<=35%
Sub Prime	<=5%
Total First Mortgage Loans	<=350%
Home Equity Loans:	
Prime	<=120%
Near Prime	<=25%
Sub Prime	<=5%
Total Home Equity Loans	<=150%
Commercial Real Estate Loans	
Prime	<=335%
Risk Rating > 3	<=7.5%
DSCR < 1.1	<=7.5%
Total Commercial Real Estate Loans	<=350%

Concentration Risk

Concentration Risk – OCC

Concentration risk management encompasses the management of pools of exposures, whose collective performance has the potential to affect the financial institution negatively even if each individual transaction within a pool is soundly underwritten.

When exposures in a pool are sensitive to the same economic, financial, or business development, that sensitivity, if triggered, may cause the sum of the transactions to perform as if it were a single, large, exposure.

Concentration Risk

Concentration Risk – OCC

When financial institutions set higher concentration limits for broadly defined pools – especially where those limits are more than 100 percent of capital – the OCC expects appropriate sub-limits for material groups of segmented exposures.

Stress testing is an effective tool to quantify the risk impact on pools of loans from different scenarios.

Credit Loss Modeling - CECL

Current Expected Credit Loss (CECL) Model

- ***Why*** – GAAP did not properly reflect risk pre-financial crisis because of the delayed recognition of credit losses
- ***What*** – ASU 2016-13 Measurement of Credit Losses on Financial Instruments
- ***When*** – Issued June 16th, effective 2020 (SEC filers) or 2021 for banks, early adoption permitted beginning 2019
- ***How*** – Adopt a cumulative effect adjustment to retained earnings

Analyzing Concentration Risk

Benefits of Stress Testing Credit Exposure

- Stress testing can determine lifetime credit losses in adverse economic environments
- Results can quantify credit exposure in concentration policy limits by testing thresholds at fully lent out balances
- Leads to a dynamic process to set concentration risk sub-limits that can be integrated into organizational strategy
- Can show interrelated risks when incorporated into ALM (concentration, credit, interest rate, and liquidity risk)
- Add even further value when integrated into risk-based pricing and real return analysis

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Risk Based Capital

Risk-Based Capital Considerations

Risk-Based Capital Ratio

Section and Description	Outstanding Balance	Risk Weight	Risk-Weighted Balance
Investments			
Agency MBS securities	$100	20%	$20
Loans			
Current 1st lien residential loans (low to medium risk)	$100	50%	$50
Current commercial loans (low to medium risk)	$100	100%	$100

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Risk Based Capital

Risk-Based Capital Considerations

Constant Balance Sheet		FNMA MBS			First Mortgage Loan			Commercial Loan		
	Yield	Assets	Liabilities	Return	Assets	Liabilities	Return	Assets	Liabilities	Return
FNMA MBS	2.22%	$ 100,000		$ 2,220			$ -			$ -
First Mortgage Loan	3.78%			$ -	$ 100,000		$ 3,780			$ -
Commercial Loan	4.20%			$ -			$ -	$ 100,000		$ 4,200
Cost of Funds (1)	0.52%		$ 98,200	$ (511)		$ 95,500	$ (497)		$ 91,000	$ (473)
Required Equity (2)	12.00%		$ 1,800	$ (216)		$ 4,500	$ (540)		$ 9,000	$ (1,080)
		$ 100,000	$ 100,000	$ 1,493	$ 100,000	$ 100,000	$ 2,743	$ 100,000	$ 100,000	$ 2,647

Potential Balance Sheet		FNMA MBS			First Mortgage Loan			Commercial Loan		
	Yield	Assets	Liabilities	Return	Assets	Liabilities	Return	Assets	Liabilities	Return
FNMA MBS	2.22%	$ 500,000		$ 11,100			$ -			$ -
First Mortgage Loan	3.78%			$ -	$ 200,000		$ 7,560			$ -
Commercial Loan	4.20%			$ -			$ -	$ 100,000		$ 4,200
Cost of Funds	0.52%		$ 491,000	$ (2,553)		$ 191,000	$ (993)		$ 91,000	$ (473)
Required Equity	12.00%		$ 9,000	$ (1,080)		$ 9,000	$ (1,080)		$ 9,000	$ (1,080)
		$ 500,000	$ 500,000	$ 7,467	$ 200,000	$ 200,000	$ 5,487	$ 100,000	$ 100,000	$ 2,647

(1) Cost of funds for all Nebraska commercial banks quarter ending September 30, 2016 SNL Financial
(2) Duff & Phelps 2016 Valuation Handbook Guide to Cost of Capital

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Asset Liability Management

Summary

Incorporating credit loss modeling under both a base case and economically stressed scenarios allows an organization to proactively manage its balance sheet and optimize the balance between return and capital to put at risk in pursuit of returns.

The iterative process of testing business strategies for credit risk impact also serves to strengthen policies (Concentration Risk Policy) and business practices (risk-based pricing).

Services and Contact Information

Asset Liability Management, Capital Stress Testing, Concentration Risk Analyses, and CECL

Matt Erickson merickson@wilwinn.com

Mergers and Acquisitions, ASC 310-30, Goodwill Impairment Testing, and TDRs:

Brenda Lidke blidke@wilwinn.com

Servicing Rights and Mortgage Banking Derivatives:

Eric Nokken enokken@wilwinn.com

Non-agency MBS:

Amin Mohomed amohomed@wilwinn.com

Contact Information

Wilary Winn LLC
First National Bank Building
332 Minnesota Street, Suite 1750
Saint Paul, MN 55101
651-224-1200

www.wilwinn.com

Wilary Winn LLC