Loan Portfolio Management Strategies

Using Business Intelligence to make better decisions

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What is Loan Portfolio Management?

Using business strategies, based on good intelligence, to offer a broad spectrum loan products to members/consumers that provide consistently positive cash-flow to the credit union.

Strategy

- Market Position
- Origination Channels
- Pricing
- Collections
- Recovery
- Loss Mitigation

Intelligence

- Acquiring Information
- Understanding Acquired Information
- Using Understanding to Implement Strategy

Without Data, you're just another person with an opinion.

W. Edwards Deming

Intelligence IS NOT solely an experientially-based opinion

Why Does Experientially-Based Opinion (Intuition) Fail?

- We are inconsistent
- We remember things that didn't happen
- We are not as good as we think we are
- We won't give up on bad data
- We anchor on irrelevant or over-weighted data
- We get hungry and tired

Daniel Kahneman, Psychologist

Top 5 Cognitive Biases

- Availability Heuristic (this just happened)
- Salience Error (fear factor)
- Ostrich Effect (that can't happen)
- Outcome Bias (that's never happened)
- Confirmation Bias (that's what I thought would happen)

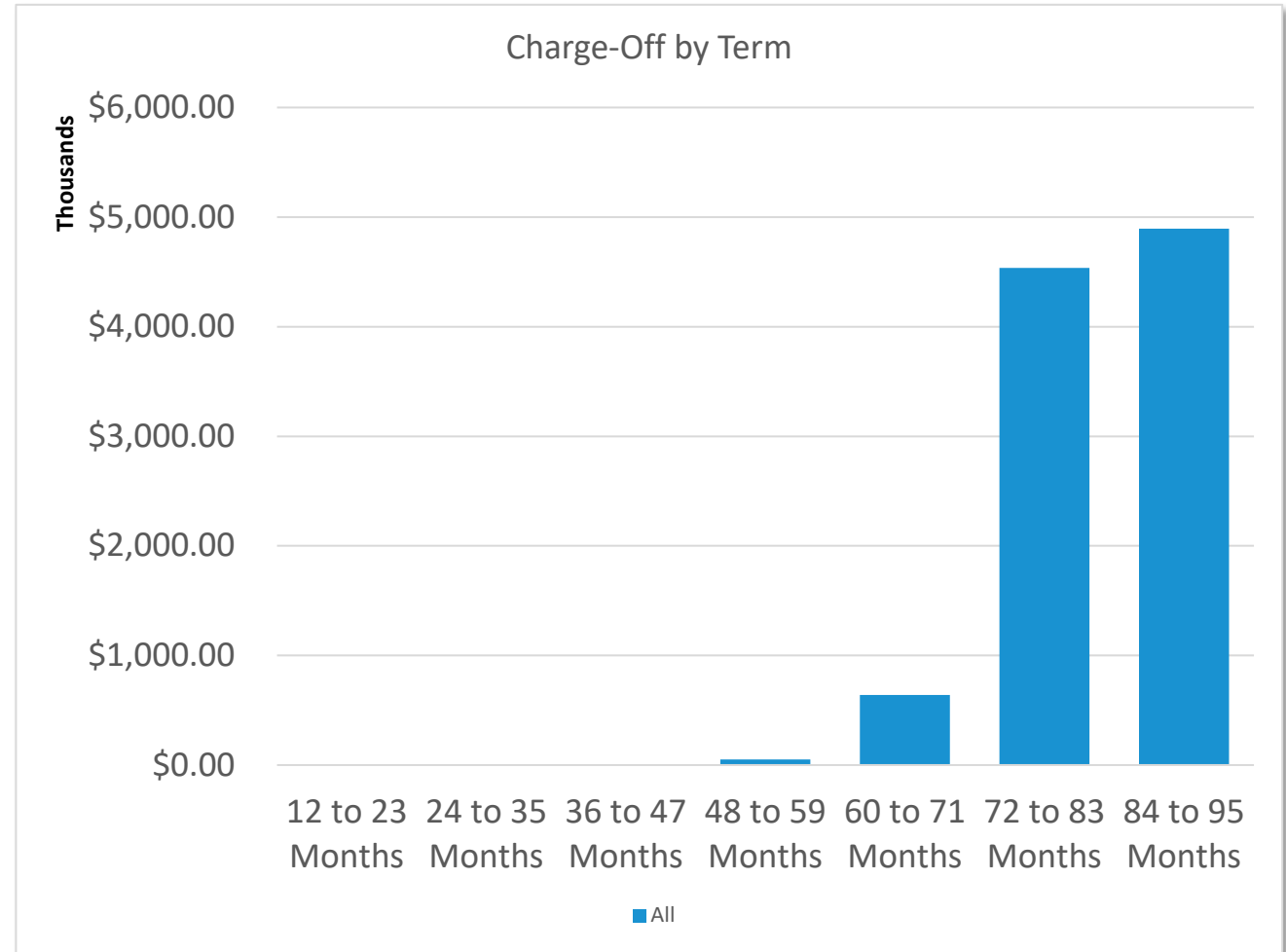# Four Cases Studies in Data-Driven Lending Decisions

- What lending channels should we use?

- How can we generate more loans?

- How can we accurately predict loan performance?

- How can we price our loans competitively and still be profitable?

- How can I manage and diversify portfolio risk?

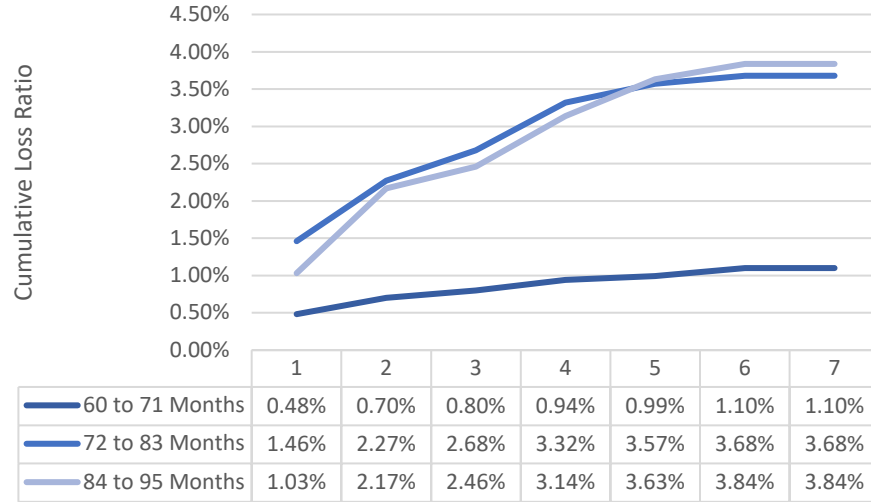- How can I automate more of the lending process?

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Case Study #1: We can't do Indirect Lending anymore.

Experience Informing Decision

- Significant losses taken on loans with terms > 84 months.

- Can't compete in Indirect w/o 84-month term.

- Indirect Lending curtailed end of 2017 impacting loan growth considerably in 2018.

Charge-Off by Term

(Bar chart, Thousands: $0.00 to $6,000.00)

Term	Value
12 to 23 Months	
24 to 35 Months	
36 to 47 Months	
48 to 59 Months	~$50
60 to 71 Months	~$600
72 to 83 Months	~$4,500
84 to 95 Months	~$4,900

■ All

2013 Static Pool

	1	2	3	4	5	6	7
60 to 71 Months	0.48%	0.70%	0.80%	0.94%	0.99%	1.10%	1.10%
72 to 83 Months	1.46%	2.27%	2.68%	3.32%	3.57%	3.68%	3.68%
84 to 95 Months	1.03%	2.17%	2.46%	3.14%	3.63%	3.84%	3.84%

2014 Static Pool

	1	2	3	4	5	6
60 to 71 Months	0.87%	1.55%	2.46%	3.17%	3.17%	3.17%
72 to 83 Months	1.87%	3.58%	5.13%	6.15%	6.61%	6.61%
84 to 95 Months	1.23%	2.96%	5.15%	6.35%	6.79%	6.79%

2015 Static Pool

	1	2	3	4	5
60 to 71 Months	0.62%	0.64%	1.22%	1.23%	1.23%
72 to 83 Months	0.52%	2.32%	4.34%	4.79%	4.79%
84 to 95 Months	0.58%	2.67%	4.39%	5.03%	5.03%

2017 Static Pool

	1	2	3
60 to 71 Months	0.90%	2.19%	2.19%
72 to 83 Months	0.38%	1.56%	1.56%
84 to 95 Months	0.25%	1.04%	1.10%

2013

	Average Balance	Charge-Off Amount	Annualized Loss Ratio
60 to 71 Months	$1,317,849	$1,102	1.00%
72 to 83 Months	$4,208,428	$9,731	2.77%
84 to 95 Months	$2,606,817	$5,350	2.46%

2014

	Average Balance	Charge-Off Amount	Annualized Loss Ratio
60 to 71 Months	$2,004,095	$3,108	1.86%
72 to 83 Months	$7,130,448	$18,233	3.07%
84 to 95 Months	$10,471,623	$23,278	2.67%

2015

	Average Balance	Charge-Off Amount	Annualized Loss Ratio
60 to 71 Months	$1,273,885	$777	0.73%
72 to 83 Months	$6,436,726	$11,845	2.21%
84 to 95 Months	$12,907,965	$23,354	2.17%

2016

	Average Balance	Charge-Off Amount	Annualized Loss Ratio
60 to 71 Months	$1,258,056	$654	0.62%
72 to 83 Months	$5,111,771	$8,199	1.92%
84 to 95 Months	$16,952,852	$24,011	1.70%

84 Month Losses by Credit Tier

Cumulative Loss Ratio By Tier
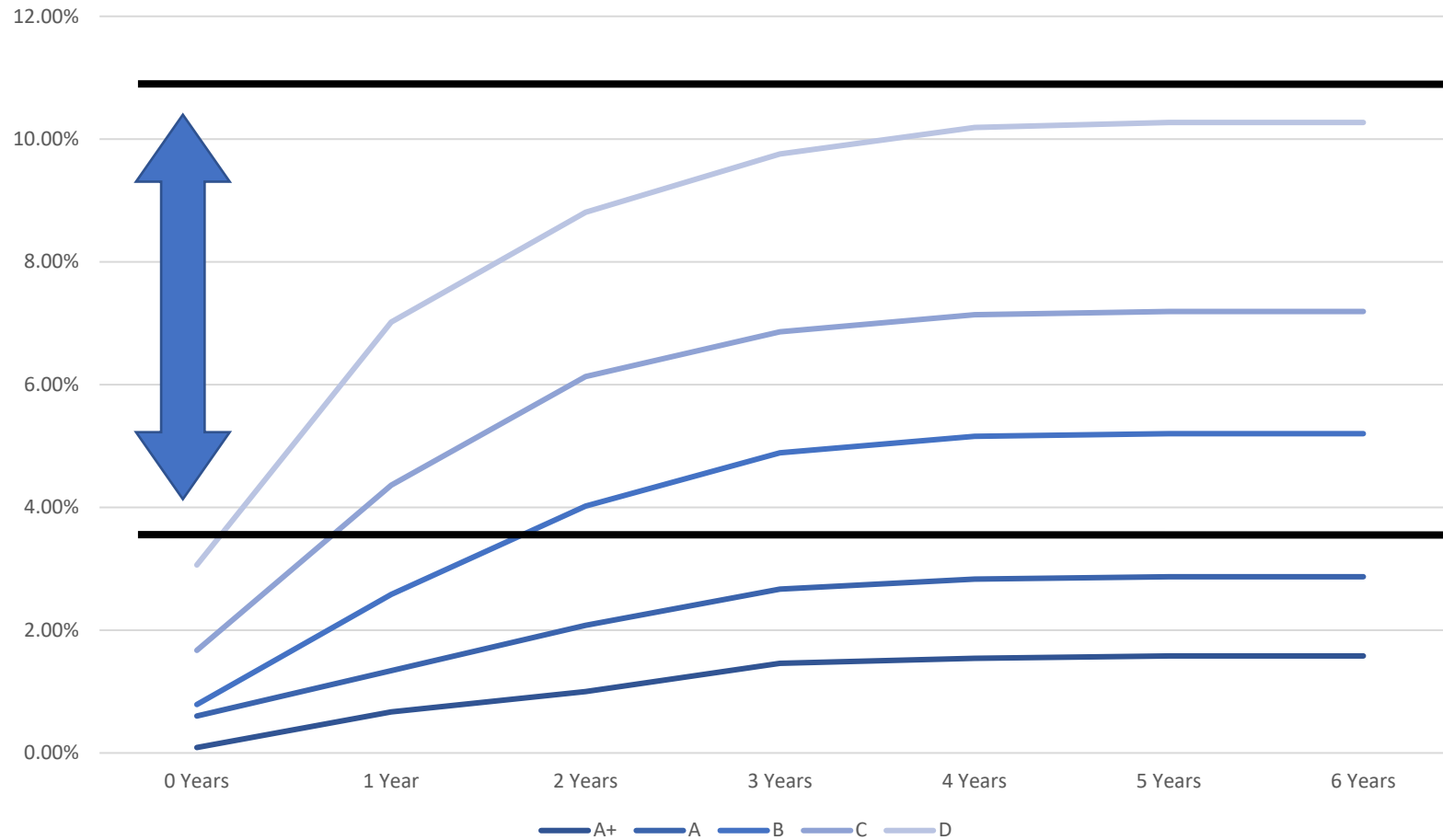
Summary of Analysis

- Credit Union Indirect loan performance was poor, especially on loans with 72 – 84-month terms.

- Poor performance, however, was predominately B, C and D borrowers.

- Credit union could have more precisely priced for risk.

- Cutting indirect for the wrong reason had a negative impact on future growth.

Case Study #2: Is Direct or Indirect more profitable

Experience Informing Decision

- Internal argument of the profitability of delivery channels

- Charge-Off dollars weighted highly in the comparison

- Comparisons done were not Apples to Apples.

Two Different Views of Net Yield

Net Yield measured on all loans during the same period

All Originations		
	Direct	Indirect
2017	3.44%	2.03%
2018	3.69%	2.78%

Net Yield measured on loans originated in a defined period of time.

2017-18 Originations Only		
	Direct	Indirect
2017	2.46%	4.13%
2018	2.52%	3.11%

Segmented Cash Flows

2017 Origination Pool - 27 Months

90-100% LTV

Tier	Avg Balance	Annualized Income	Total Losses	Avg Annual Yield	Annualized Loss Ratio	Annualized Net Yield
A+	$988,768	$32,387	$0	3.28%	0.00%	3.28%
A	$1,108,626	$45,795	$0	4.13%	0.00%	4.13%
B	$901,230	$53,511	$8,989	5.94%	0.44%	5.49%
C	$280,582	$22,158	$0	7.90%	0.00%	7.90%
D	$40,871	$4,966	$0	12.15%	0.00%	12.15%

100-120% LTV

Tier	Avg Balance	Annualized Income	Total Losses	Avg Annual Yield	Annualized Loss Ratio	Annualized Net Yield
A+	$1,561,829	$52,756	$569	3.38%	0.02%	3.36%
A	$3,993,865	$155,464	$87,430	3.89%	0.97%	2.92%
B	$4,626,373	$253,716	$85,883	5.48%	0.83%	4.66%
C	$1,943,510	$132,280	$42,390	6.81%	0.97%	5.84%
D	$257,193	$20,955	$8,316	8.15%	1.44%	6.71%

>120% LTV

Tier	Avg Balance	Annualized Income	Total Losses	Avg Annual Yield	Annualized Loss Ratio	Annualized Net Yield
A+	$1,233,052	$42,285	$43,498	3.43%	1.57%	1.86%
A	$2,628,751	$107,617	$73,194	4.09%	1.24%	2.86%
B	$2,153,677	$115,466	$42,388	5.36%	0.87%	4.49%
C	$451,222	$27,083	$24,329	6.00%	2.40%	3.61%
D	$60,591	$4,585	$0	7.57%	0.00%	7.57%

Measure ALL Cashflows equally amount all segments

Cashflows	Performance KPI's		
5.98% WAR	$1.10bn Origination Amount	60K Origination Count	$18K Average Origination A...
0.35% WA COF	$179.30M Current Balance	7944 Open Count	$2.97K Average Remaining Bal...
0.32% WA Orig Exp	16.30% Remaining Balance %	31.28 WA Aging Months	-0.84% WA Repayment Speed
0.94% WA Loss	$21M Net Charge-Off Amount	2789 Charge-Off Count	$7,582 Average Charge-Off
4.36% WA Net Income R...	$12.72K WA Monthly Balance	76.50 Weighted Average Term	65.57% Avg Loss Severity

Southwest Lending & Collections Conference

Summary of Analysis

- Profitability can "appear" to be different, depending upon what measure and period you use to measure.

- Isolation of product attributes enables one to see key differences in performance that are not explainable by the broader product category.

- Granular analysis allows lenders to more accurately price loans.

Case Study #3: Granular Product Cash Flows

Experience Informing Decision

- Some products require more effort to service and draw more attention

- High losses in one segment indicate lower profitability

- Pricing fails to adequately cover all costs

Cash Flows by Product

Loan Group	Avg Monthly Balance	WAR	COF	Dealer Fee %	OE	Avg Loss %	Est. Avg Net Yield
Direct Auto	$6,691,845.72	4.29%	0.22%	0.00%	2.10%	0.27%	1.70%
Indirect New Auto	$35,276,061.12	2.80%	0.22%	0.82%	1.10%	0.41%	0.25%
Indirect Used Auto	$22,611,220.70	3.59%	0.22%	0.89%	1.10%	0.77%	0.61%
Mortgage	$55,587,281.07	3.76%	0.22%	0.00%	2.10%	0.00%	1.44%
Other	$61,054,848.49	4.36%	0.22%	0.00%	2.10%	0.26%	1.79%
Signature	$4,932,216.26	10.91%	0.22%	0.00%	2.10%	2.16%	6.43%

Cash Flows by Product & Risk Tier

Tier	Loan Group	Avg Monthly Balance	WAR	COF	Dealer Fee %	OE	Avg Loss %	Est. Avg Net Yield
Risk Tier 1	Direct Auto	$2,519,017.53	2.98%	0.22%	0.00%	2.10%	0.00%	0.66%
Risk Tier 1	Indirect New Auto	$23,121,474.42	2.20%	0.22%	0.76%	1.10%	0.16%	-0.04%
Risk Tier 1	Indirect Used Auto	$11,141,725.30	2.32%	0.22%	0.84%	1.10%	0.15%	0.01%
Risk Tier 1	Signature	$1,608,813.63	9.38%	0.22%	0.00%	2.10%	0.93%	6.12%

Tier	Loan Group	Avg Monthly Balance	WAR	COF	Dealer Fee %	OE	Avg Loss %	Est. Avg Net Yield
Risk Tier 3	Direct Auto	$1,489,783.02	5.20%	0.22%	0.00%	2.10%	0.36%	2.51%
Risk Tier 3	Indirect New Auto	$3,054,282.79	5.19%	0.22%	0.67%	1.10%	1.76%	1.43%
Risk Tier 3	Indirect Used Auto	$3,389,516.26	5.44%	0.22%	1.03%	1.10%	1.39%	1.70%
Risk Tier 3	Signature	$870,855.34	12.69%	0.22%	0.00%	2.10%	1.93%	8.45%

Summary of Analysis

- Product profitability is more precisely calculated using lifetime cashflows rather than period calculations.

- Drilling-down into data can provide information as to what risk factors are more impactful to product profitability.

- Providing this level of information help supports decisions of lenders to increase or decrease risk.

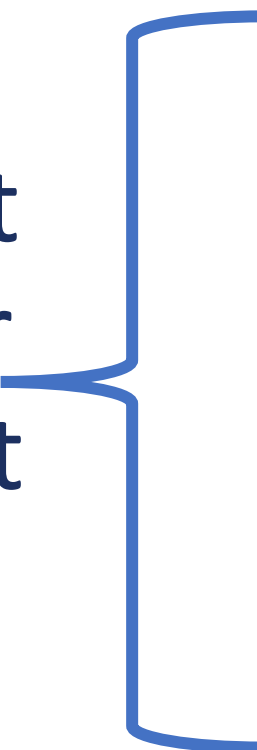# Case Study #4: Portfolio too low-risk weighted

Experience Informing Decision

- Unequal distribution of loan risk
- Credit Union doesn't tolerate losses well
- Yield on portfolio is too low

Credit Scores Mean Something

Southwest Lending
& Collections Conference

Strongest Predictor of default

	Origination Count	Predicted 90 Day Default Count	Predicted 90-Day Default Rate	Actual 90-Day Default Count	Actual 90-Day Default Rate
< 500	52	20	38.46%	7	13.46%
520-539	17	5	29.51%	3	17.65%
540-559	13	3	24.39%	1	7.69%
560-579	27	6	22.22%	7	25.93%
580-599	41	8	18.87%	7	17.07%
600-619	79	12	15.38%	13	16.46%
620-639	150	19	12.35%	25	16.67%
640-659	330	33	9.90%	37	11.21%
660-679	436	33	7.58%	29	6.65%
680-699	510	28	5.49%	21	4.12%
700-719	563	22	3.85%	18	3.20%
720-739	523	13	2.52%	15	2.87%
740-759	427	7	1.63%	8	1.87%

LTV is highly predictive of loss given default
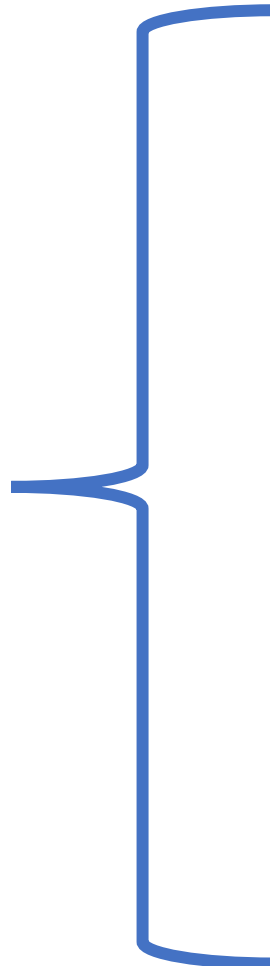
	Origination Count	Predicted 90-Day Default Count	Predicted 90-Day Default Rate	Actual 90-Day Default Count	Actual 90-Day Default Rate
Tier 1					
101-110%	557	4	0.68%	9	1.62%
111-120%	428	3	0.68%	17	3.97%
> 120%	9	0	0.68%	2	22.22%
Tier 2					
101-110%	485	20	4.08%	25	5.15%
111-120%	177	7	4.08%	14	7.91%
> 120%	8	0	4.08%	1	12.50%
Tier 3					
101-110%	499	43	8.60%	54	10.82%
111-120%	106	9	8.60%	9	8.49%
> 120%	4	0	8.60%	1	25.00%
Tier 4					
101-110%	109	12	11.37%	19	17.43%
111-120%	24	3	11.37%	4	16.67%
> 120%	1	0	11.37%	1	100.00%
Tier 5					
101-110%	62	9	14.52%	14	22.58%
111-120%	18	3	14.52%	3	16.67%
> 120%			14.52%		
Tier 6					
101-110%	62	22	36.20%	18	29.03%
111-120%	14	5	36.20%	4	28.57%
> 120%	2	1	36.20%	0	0.00%

Dynamic Loan Pricing Allows Lenders Flexibility

Auto Loan Rates – No Filter

Tier	Origination Amount Remaing Balances	Probability of Loss	Months to Charge-Off	Loss Given Default	Allowance for Loan Loss	Risk Premium	WA Orig Exp	Risk Free Rate	Target ROAA	Minimum Rate
	225,619.30	1.20%	18.00	5,101.57	$2,698	0.95%	0.00%	1.52%	1.00%	3.47%
A+	78,903,459.20	1.16%	23.77	10,900.84	$913,392	0.58%	0.38%	1.52%	1.00%	3.48%
A	57,155,576.48	2.33%	23.23	10,776.41	$1,333,188	1.12%	0.43%	1.52%	1.00%	4.07%
B	33,978,649.33	4.46%	22.42	10,994.94	$1,514,044	2.15%	0.49%	1.52%	1.00%	5.16%
C	13,427,552.93	3.71%	19.83	9,664.49	$497,770	1.82%	0.46%	1.52%	1.00%	4.80%
D	3,106,726.92	8.87%	25.56	9,144.13	$275,497	4.43%	0.25%	1.52%	1.00%	7.20%
E	743,057.51	35.39%	18.24	7,580.56	$262,982	22.51%	0.06%	1.52%	1.00%	25.08%
Unknown									1.00%	1.00%
Total	**187,540,641.67**	**3.04%**	**22.22**	**10,227.96**	**$5,705,468**	**1.49%**	**0.40%**	**1.52%**	**1.00%**	**4.41%**

Dynamic Loan Pricing Allows Lenders Flexibility

Auto Loan Rates – No Filter

| Tier	Origination Amount Remaing Balances	Probability of Loss	Months to Charge-Off	Loss Given Default	Allowance for Loan Loss	Risk Premium	WA Orig Exp	Risk Free Rate	Target ROAA	Minimum Rate
									1.00%	1.00%
A+	4,653,072.21	0.79%	15.50	9,831.43	$36,632	0.44%	1.29%	1.52%	1.00%	4.25%
A	8,548,526.95	3.42%	19.24	12,478.95	$292,714	1.72%	1.15%	1.52%	1.00%	5.39%
B	7,084,093.76	4.25%	18.76	12,378.31	$301,269	2.11%	0.99%	1.52%	1.00%	5.63%
C	2,139,568.67	4.70%	16.00	11,761.73	$100,623	2.25%	0.85%	1.52%	1.00%	5.62%
D	188,952.91	13.19%	19.67	15,912.25	$24,926	7.47%	0.66%	1.52%	1.00%	10.65%
E	90,192.30	19.46%	19.67	5,231.28	$17,554	12.58%	0.76%	1.52%	1.00%	15.86%
Unknown									1.00%	1.00%
Total	**22,704,406.80**	**3.85%**	**18.40**	**12,055.17**	**$875,211**	**1.95%**	**1.06%**	**1.52%**	**1.00%**	**5.53%**

Summary of Analysis

- The credit union should be continually measuring performance against predictive values.

- It is important to understand the different between the risk of default and the risk of loss.

- It is important that the credit union is accurately pricing loans based relative risk factors, not simply pricing categories based on credit score and term.

- Provide feedback-loop to underwriters.

Other Areas to Monitor

Key Performance Indicators
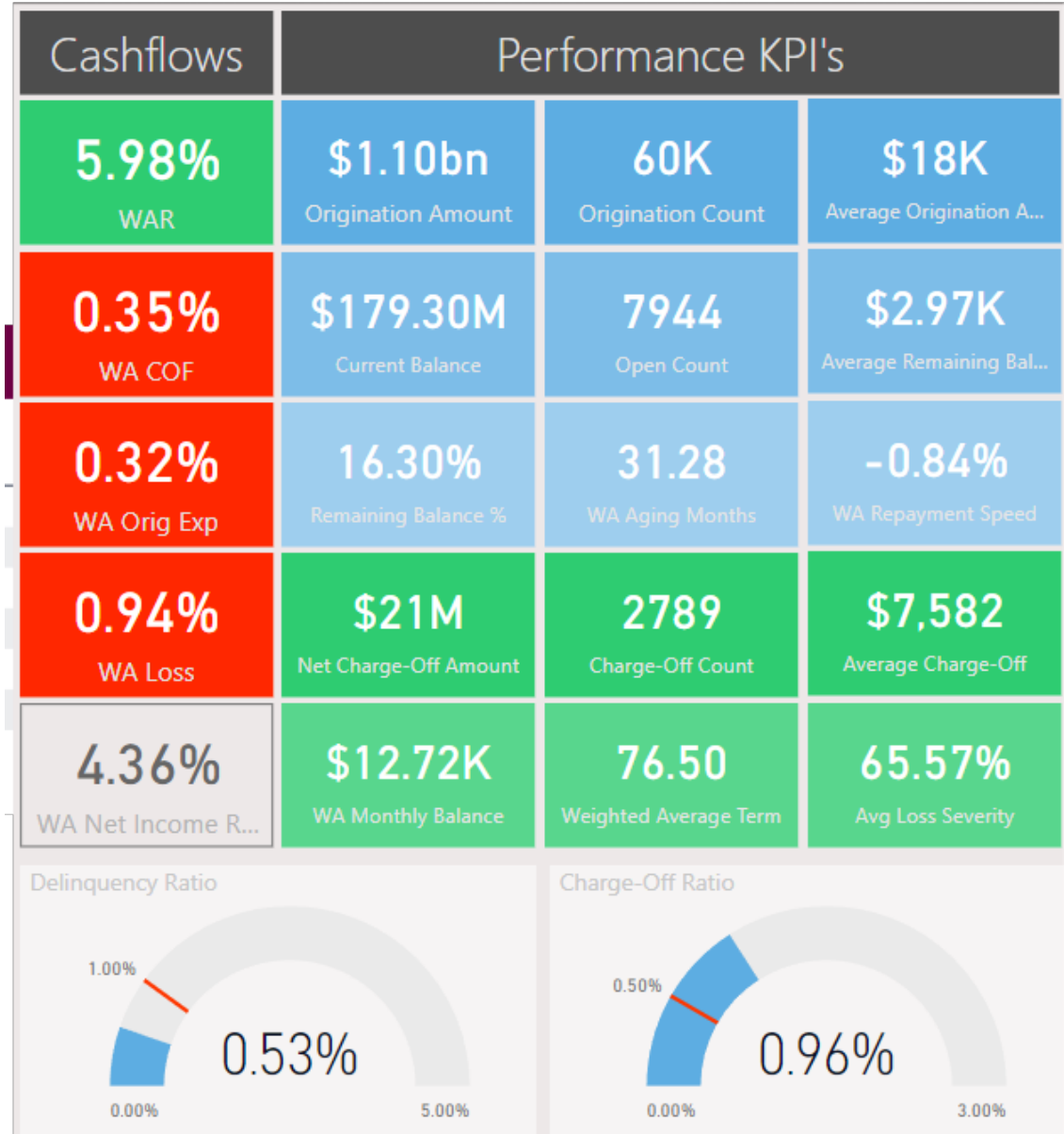
Dealer Management

Dealer	Origination Amount	Orig WAR	Weighted Average Term	WA Credit Score	WA of LTV (36 months)	Delinquency Ratio	Net Charge-Off Amount	Cumulative Loss Ratio - Agg
Rogers Ford (460154)	$27,428	7.00%	72.00	657	110.00%	NaN	$14,578	53.15%
Amerian Ford (460401)	$69,710	5.06%	78.79	680	109.72%	NaN	$16,250	23.31%
Beacon Motors (460250)	$242,042	5.51%	65.87	707	96.13%	0.00%	$14,743	6.09%
SouthBridge Chevrolet (462111)	$238,609	5.59%	82.45	760	109.48%	0.00%	$11,822	4.95%
Private Auto Sales (460226)	$1,290,084	7.60%	67.31	615	98.44%	0.00%	$57,806	4.48%
Morgan Land Rover (461041)	$225,352	4.45%	68.00	749	75.62%	0.00%	$9,799	4.35%
Brent's Car Corner (460204)	$105,298	6.52%	65.60	688	110.42%	0.00%	$3,921	3.72%
Banford Kia (461159)	$286,034	6.31%	77.07	688	109.87%	0.00%	$8,055	2.82%
Uncle Sam's Dodge (460326)	$800,004	4.61%	81.48	719	103.73%	0.00%	$16,119	2.01%
Ryan's Auto Sales (461140)	$1,802,132	4.02%	81.01	754	83.94%	0.00%	$30,509	1.69%
Stanford Chrysler Jeep Dodge (461028)	$258,664	6.12%	72.77	685	87.07%	0.00%	$3,490	1.35%
Jimmy Dean Buick (462066)	$683,059	3.89%	79.46	764	107.98%	0.00%	$8,711	1.28%
Watson Auto Group (460036)	$472,422	4.41%	72.44	728	89.61%	12.73%	$5,431	1.15%
Steven's Ford (461118)	$2,250,573	4.08%	76.81	753	77.82%	0.00%	$23,677	1.05%
Private Auto Sales (461109)	$330,394	6.79%	51.62	707	78.15%	0.00%	$2,671	0.81%
RV Center, Inc (461138)	$1,044,428	5.52%	80.18	707	95.03%	0.00%	$7,618	0.73%
Beacon Motors (461133)	$11,509,190	4.42%	78.81	734	82.82%	0.46%	$49,327	0.43%
Hunter Ford (461023)	$5,320,040	4.39%	81.09	736	77.70%	0.70%	$7,412	0.14%
John Calhoun Ford (460317)	$6,063,821	3.87%	77.68	760	63.89%	0.00%	$7,584	0.13%
City Ford (461094)	$161,123	5.31%	76.90	722	99.14%	0.00%	$161	0.10%
Green Mountain Mitsubishi (461093)	$21,667,132	3.85%	76.10	753	81.06%	0.00%	$12,197	0.06%
Amerian Ford (462084)	$21,810	8.60%	72.00	684	124.00%	0.00%	$0	0.00%
Avina Ford/Lincoln (460042)	$22,651	6.94%	72.00	716	115.00%	0.00%	$0	0.00%
Avina Ford/Lincoln (461013)	$108,171	3.93%	77.00	753	91.60%	0.00%	$0	0.00%
Avina Ford/Lincoln (462110)	$441,796	4.20%	82.80	729	90.90%	0.00%	$0	0.00%
Banford Auto Group (461087)	$92,469	5.65%	84.00	694	109.01%	0.00%	$0	0.00%
Banford Chrysler Dodge Jeep Ram (462059)	$513,495	5.22%	82.41	706	108.66%	0.00%	$0	0.00%

Application Decisions
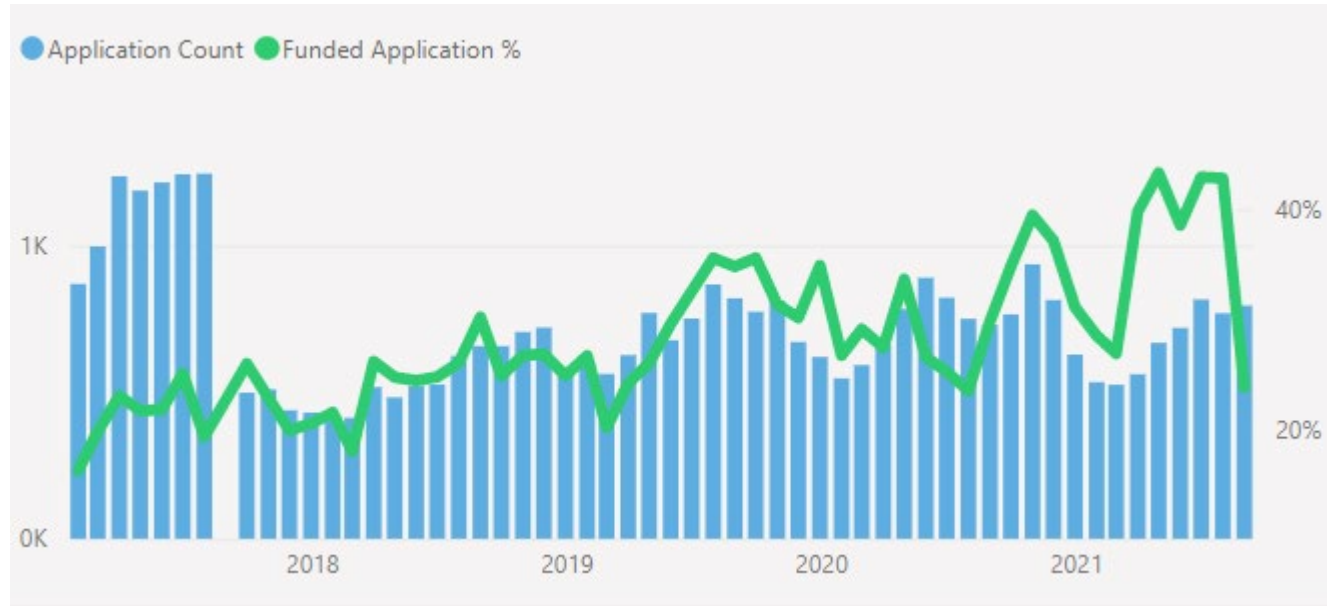
Thank You!

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