



Risk Scorecard for 'Current Personas & PyMEs'

Model Monitoring & Validation Report

July 2020

Model Overview

Model Objective

Risk Scorecard for portfolio of individuals (personas) & Pyme (small and medium sector enterprises)

Eligibility criteria - 0 days past due on all credit cards, loans & mortgage accounts in the month of scoring

Data Overview

	Development Cohort	Validation Cohort
Performance Window	Apr'13 to Sep'13	Jul'19 to Dec'19
# Total Customers	375,915	680,085
# Bad(1)	372,224	36,746
# Good(0)	3,691	643,339
Event Rate/ Bad Rate	1%	5.4%
Mean Score (Good)	736	744
Mean Score (Bad)	646	659

Model Performance Summary

1. Model's discriminatory power is same as before

The results are same as the ones received during Development period. This could be due to some overrides in the charge offs. We will have to wait for another set of results to see if the trend continues.

2. Default rate for the individual customers portfolio has increased significantly

Default rate has increased from 1% to 5.4%, potentially due to change in origination risk rules or due to changing macroeconomic environment over the 6 year period. Though the overall PSI index is within the benchmark, there is a higher then expected proportion of population in the second decile.

3. Rank ordering is broken at multiple points, with high variation in default rate for same risk score buckets

There was a major rank order break coming from the 500-560 bin to the 560-620 bin. There is a significant volume of customers in the 560-620 bin – nearly one third of those had a bad performance.

Model Risk Rating



Model Discrimination



Rank Ordering



Population Stability



Characteristic Stability








Recommendation based on model monitoring

Give the high annual default rate of ~9.4% & decreasing discriminatory power of the model, opportunity to re-develop the scorecard to improve the discrimination performance. Materiality impact to be reviewed to identify potential incremental impact of scorecard re-development

Model Discrimination Results

Model’s discriminatory power is same as before

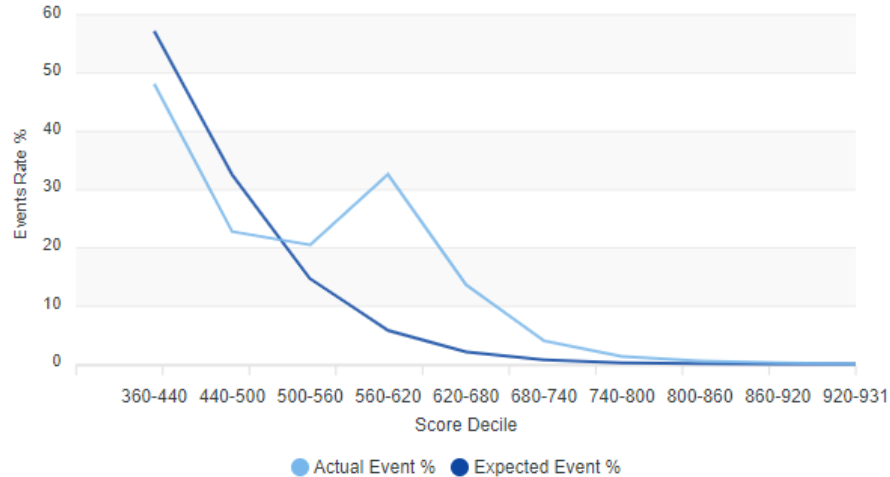
The results are same as the ones received during Development period. This could be due to some overrides in the charge offs. We will have to wait for another set of results to see if the trend continues.

Metric	Development	Validation	% Change	Risk
F1 Score	-	0.92	-	
KS Statistic	50%	50%	0%	
AUC	82%	83%	1%	
Gini Score	65%	65%	0%	
Divergence	1.72	1.72	0%	

Rank Ordering – Actual vs Expected

Rank ordering is broken at multiple points, with high variation in default rate for same risk score buckets

There was a major rank order break coming from the 500-560 bin to the 560-620 bin. There is a significant volume of customers in the 560-620 bin – nearly one third of those had a bad performance.



Score Decile	Count	Bad Count	Actual Bad %	Expected Bad %
360-440	27	13	48	57
440-500	583	133	23	32
500-560	3662	752	21	15
560-620	28396	9256	33	6
620-680	110933	15153	14	2
680-740	201090	8082	4	1
740-800	199348	2709	1	0
800-860	89787	542	0	0
860-920	42630	103	0	0
920-931	3629	3	0	0

Population Stability

Default rate for the individual customers portfolio has increased significantly

Default rate has increased from 1% to 5.4%, potentially due to change in origination risk rules or due to changing macroeconomic environment over the 6 year period. Though the overall PSI index is within the benchmark, there is a higher than expected proportion of population in the second decile.

Score Decile	Expected %	Actual %	Actual-Expected	ln(Actual/Expected)	Contribution To PSI
[-,647)	10	9	-0.62	-0.06	0
[647,682)	10	14	4.09	0.35	0.014
[682,704)	10	8	-1.56	-0.17	0.003
[704,720)	9	8	-1.04	-0.12	0.001
[720,734)	10	8	-2.36	-0.26	0.006
[734,748)	11	9	-1.73	-0.17	0.003
[748,766)	10	9	-0.53	-0.06	0
[766,789)	10	10	-0.24	-0.02	0
[789,825)	10	11	0.84	0.08	0.001
[825,+]	10	13	3.14	0.27	0.008

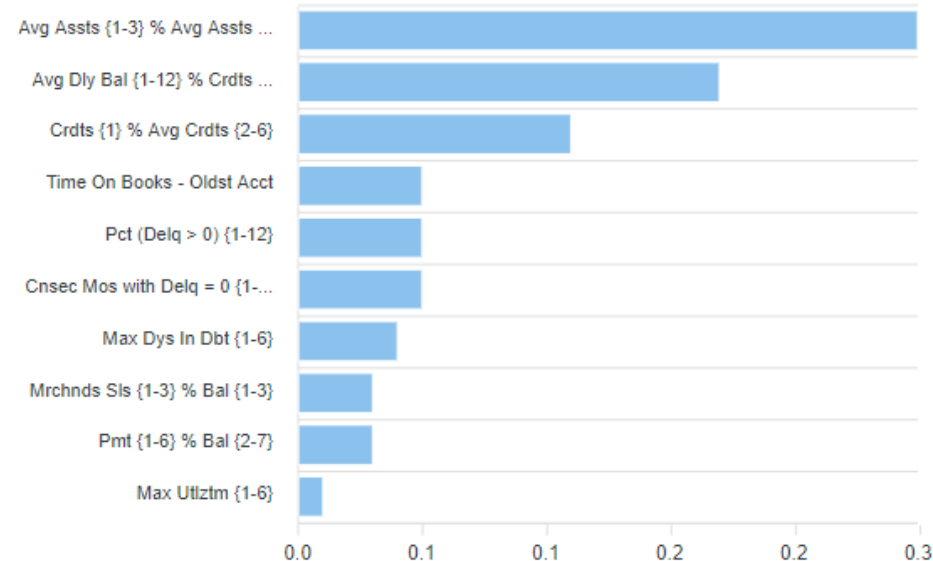
Population Stability Index = 0.036

Characteristics Stability

Drift in distribution of three model variables

CSI Index is high (>0.1) for three model variables, overall low impact of this expected due to PSI within benchmark range

CSI Scores For Significant Variables



Variable	CSI Score	Status
Avg Assts {1-3} % Avg Assts {4-12}	0.25	Orange
Avg Dly Bal {1-12} % Crdts {1-12}	0.17	Orange
Crdts {1} % Avg Crdts {2-6}	0.11	Orange
Time On Books - Oldst Acct	0.05	Green
Pct (Delq > 0) {1-12}	0.05	Green
Cnsec Mos with Delq = 0 {1-12} - Lagged	0.05	Green
Max Dys In Dbt {1-6}	0.04	Green
Mrchnds Slis {1-3} % Bal {1-3}	0.03	Green
Pmt {1-6} % Bal {2-7}	0.03	Green

Model Classification Summary

Confusion Matrix

		Predicted	
		0	1
Actual	0	596,182 (87%)	47,157 (6%)
	1	18,851 (2%)	17,895 (2%)





Event Classification Summary

Precision
27%

Recall
48%

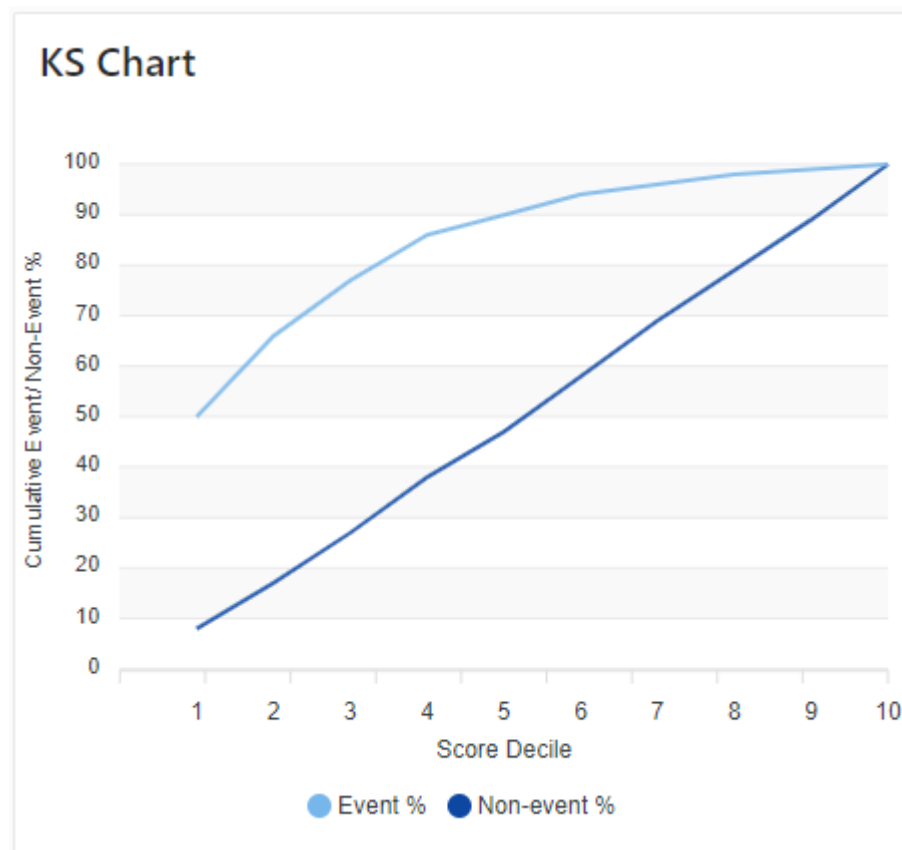
F1 Score
0.36

False Positive Rate
7%

Metric	Development	Validation	% Change	Risk
Accuracy	-	90%	-	
Precision	-	93%	-	
Recall	-	90%	-	
F1 Score	-	0.92	-	

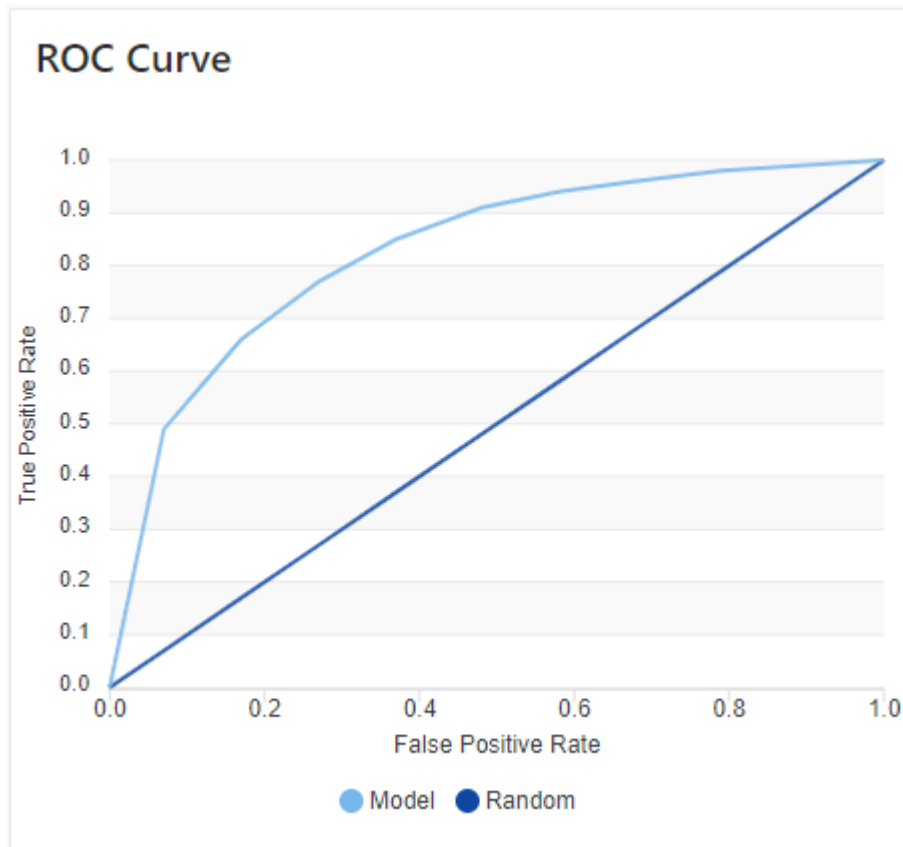
* Customer level data not available for Development Cohort to calculate values for Accuracy, Precision, Recall & F1 Score

Appendix I – KS Graph for Validation



Score Decile	Cumulative Event %	Cumulative Non Event %	KS
395	50	8	42
652	66	17	49
678	77	27	50
701	86	38	47
721	90	47	42
740	94	58	35
756	96	69	27
777	98	79	18
802	99	89	9
842	100	100	0

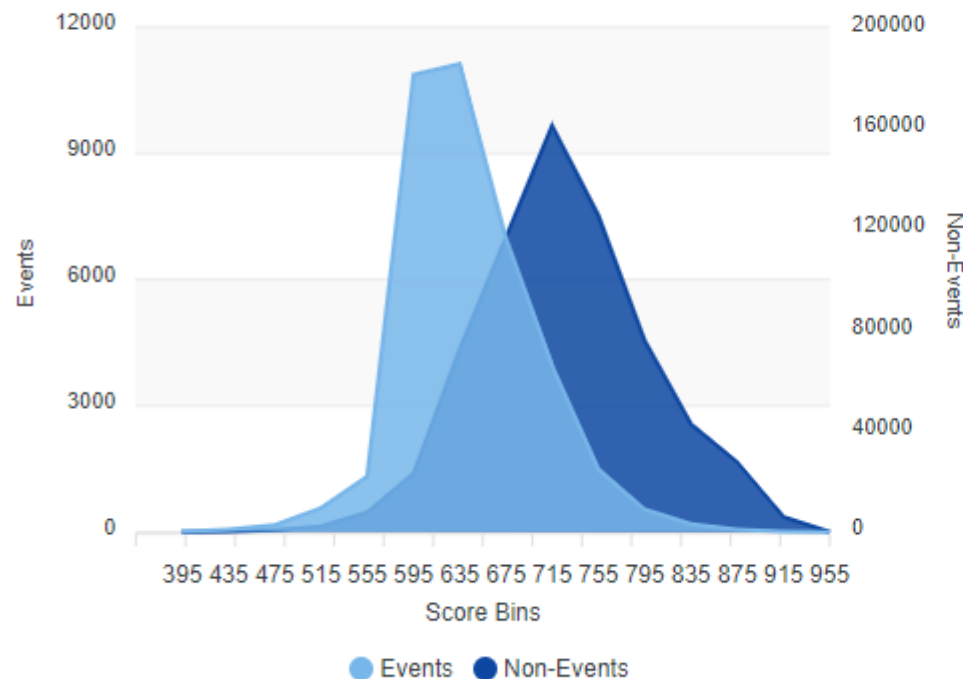
Appendix II – ROC Curve for Validation



Score Decile	FalsePositiveRate	TruePositiveRate
(394.999, 651.0]	0.07	0.49
(651.0, 677.0]	0.17	0.66
(677.0, 700.0]	0.27	0.77
(700.0, 720.0]	0.37	0.85
(720.0, 739.0]	0.48	0.91
(739.0, 755.0]	0.58	0.94
(755.0, 771.0]	0.68	0.96

Appendix III – Divergence for Validation

Divergence Chart



Divergence Summary

Event Distribution Mean
659

Non-Event Distribution Mean
744

Event Distribution Variance
3258

Non-Event Distribution Variance
5153