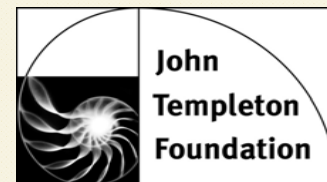


# Prevention Through Prediction: A Quantitative Approach to Client Churn



*April 17, 2009*

**Kadiri Liassou**





## Today's Discussion

- Executive Summary
- Key Findings
- Implications
- Methodology
- Data and Statistical Analysis
- Limitations
- Next Steps and Conclusion
- Questions

## Executive Summary

- Churn population: Clients who plan to leave at the end of the current loan cycle.
- Acquiring new clients and building relationships is costly. Thus, ***client churn is costly.***
- Clients who stay with FINCA believe their repayment schedules and loan duration are ***just right.***
- Product features being equal, ***credit officer performance is the decisive factor.***

## **Executive Summary**

- Quantitative modeling techniques can help.
- BUT . . . Predicting client behavior is an art, not a science.
- Monitoring the quantitative model closely is therefore indispensable.



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## Key Findings

- In predicting client churn, model consistently indicates the importance of:
- **Design** (the “what”): Loan product features, especially repayment schedule and loan duration.
- **Delivery** (the “who”): The credit officer is the face of FINCA.



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## Implications

- ***Further research and development:*** To refine product offerings.
- ***Further recruitment and training:*** Good service starts at the loan application process and goes on through the life of the loan – every phase shapes client perception of the credit officer and thus of FINCA.



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## **Methodology**

- Data from FCAT summer 2008 survey.
- Survey was conducted with clients of ten FINCA affiliates in Central Asia, Eastern Europe, Latin America, the Middle East.
- Data includes: household demographics, access to financial products, expenditures, assets, business activities and satisfaction with products and services.

## Methodology

- The dependent variable `LeaveFINCAYorN` is dichotomous.
- Logistic regression [1] was chosen as the modeling technique.
  - $\text{Log}(\text{odds of leaving FINCA}) = a + b \cdot \text{Var1} + c \cdot \text{Var2} + \dots$
  - `Var1`, `Var2`... represent the independent variables
  - $\text{Odds} = (P / (1 - P))$ .
  - `P` is the probability of a client leaving FINCA.



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## **Data and Statistical Analysis**

- Sample: A total of 3,438 clients from ten affiliates.
  - Model and validation on 2,452 from seven countries
  - Additional validation with remaining three countries.
- Data was transformed for modeling purposes.

## Data and Statistical Analysis

- Univariate analysis of all categorical variables crossed with the dependent variable: **LeaveFINCAYorN**.
- Variables with a chi-square p-value of 0.05 or less were kept.
- Tested for multicollinearity by using the variance inflation factor (VIF less than 2 for all remaining 21 variables kept from previous step).

## **Data and Statistical Analysis**

- The model tested several potential predictors including:
  - OwnerOfBusinessesYorN,
  - RightRateDuration,
  - RightRateInterest,
  - RightRateRepayment,
  - DifficultLoanApp,
  - DifficultDisbursement,
  - DifficultCreditOfficer,
  - GoalsNonAchieved,
  - PastRecommend
  - FutureRecommend2.
- Stepwise selection method used to arrive at a final model.

# Data and Statistical Analysis

Analysis of Maximum Likelihood Estimates						
Parameter	DF	Estimate	Exp(Estimate)	Standard Error	Wald Chi-Square	Pr > ChiSq
<b>RightRateDuration</b>	1	-1.0236	0.35929913 2	0.2296	19.868 8	<.0001
<b>RightRateRepayment</b>	1	-0.8824	0.41378862 6	0.2343	14.181 3	0.0002
<b>DifficultCreditOfficer</b>	1	1.5929	4.91799044	0.403	15.619 1	<.0001
<b>PastRecommend</b>	1	-1.396	0.24758532 7	0.1967	50.381 9	<.0001
<b>FutureRecommend2</b>	1	-1.0134	0.36298273 8	0.2192	21.374 2	<.0001

## **Data and Statistical Analysis**

- When loan term is a good fit, the log of odds of leaving decrease by about 1.02, all other things equal.
- Clients who are dissatisfied or very dissatisfied with credit officer's performance are five times more likely to leave, all other variables being equal.

## Data and Statistical Analysis

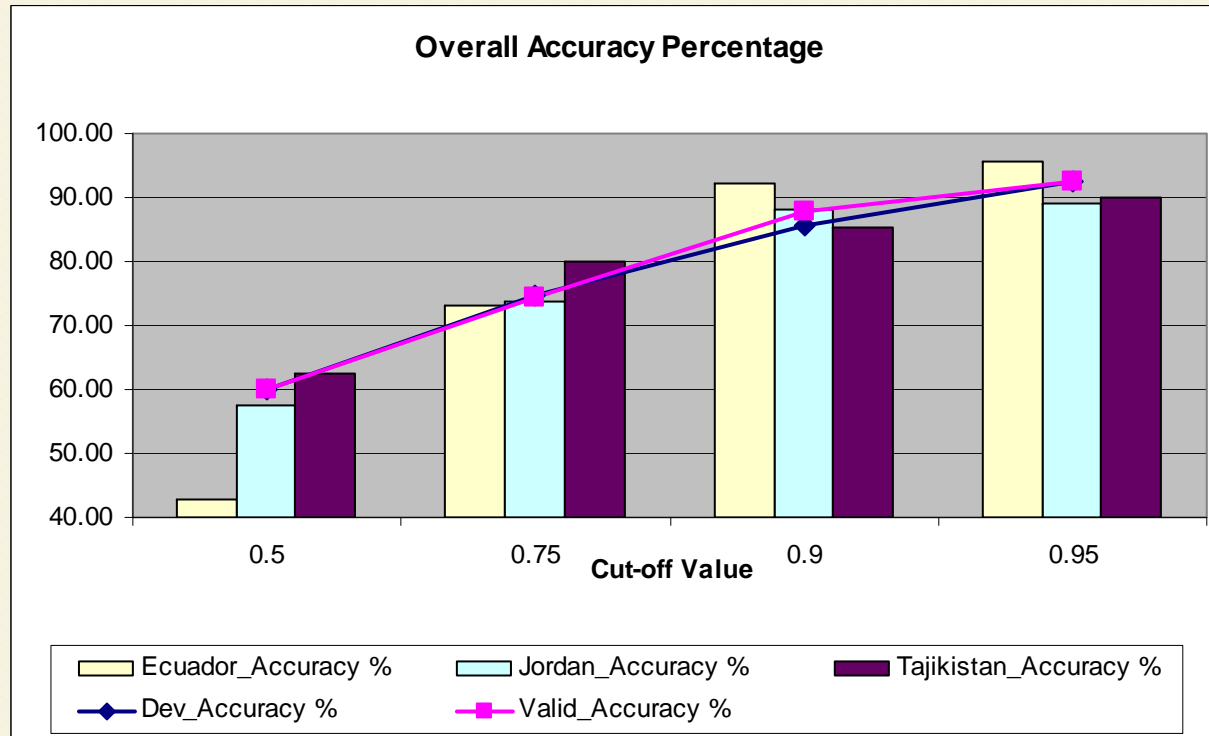
- The degree to which predicted probabilities agree with actual outcomes is expressed as either a measure of association or a classification table.

<b>Association of Predicted Probabilities and Observed Responses</b>			
<b>Percent Concordant</b>	63.8	<b>Somers' D</b>	0.411
<b>Percent Discordant</b>	22.7	<b>Gamma</b>	0.475
<b>Percent Tied</b>	13.5	<b>Tau-a</b>	0.042
<b>Pairs</b>	109415	<b>c</b>	0.706

# Data and Statistical Analysis

Datasets	(1) Actual churn ers	(2) Actua l Non- churn ers	(3) Tota l Clie nts	(4)=( 1)/(3) Actua l churn rate	(5) cut valu e	(6) Actual Non- churn ers correct ly predict ed	(7) Actu al chur ners corre ctly predi cted	(8)=( 6) + (7) Total corre ct predic tion	(9)=(6 )/(2) Percen t of Non- churn ers corre ctly predic ted	(10)=(7 )/(1) Percent of Actual churn ers correctl y predict ed	(11)=(8) /(3) Overall Percent of correct predicti on
Development	82	1407	1489	5.51 %	95%	1362	17	1379	96.80 %	20.73%	92.61%
Validation	44	919	963	4.57 %	95%	881	9	890	95.87 %	20.45%	92.42%
FINCA_Ecuad or	5	316	321	1.56 %	99%	309	0	309	97.78 %	0.00%	96.26%
FINCA_Jorda n	13	298	311	4.18 %	95%	273	4	277	91.61 %	30.77%	89.07%
FINCA_Tajiki stan	11	343	354	3.11 %	95%	317	2	319	92.42 %	18.18%	90.11%

# Data and Statistical Analysis





## Today's Discussion

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- Key Findings
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- Methodology
- Data and Statistical Analysis
- ***Limitations***
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## **Limitations**

- Model is only one tool in decision making.
- Model helps predict churn for only FINCA affiliates and therefore may or may not be directly applicable to other MFIs.



## Today's Discussion

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- Methodology
- Data and Statistical Analysis
- Limitations
- ***Next Steps and Conclusion***
- Questions

## **Next Steps and Conclusion**

- Identified significant factors associated with likelihood of client churn using data from seven programs (FINCA affiliates).
- Validated. Tool successfully applied to three additional programs.
- Results may be used to reduce costs by influencing human resources policies and product design.

## **Next Steps and Conclusion**

- Model can be improved by exploring other variables or by using actual historical data.
- Quantitative tools can help FINCA manage risk and add value for clients.

## **Next Steps and Conclusion**

- Empirical validation tool to monitor the performance of the model over time:
  - Any change in churn distribution?
  - Any change in the ability of the model to rank-order?
  - Or any shift in characteristics distributions?

## **For further questions**

- Contact Kadiri Liassou at:
  - [Akiwala@hotmail.com](mailto:Akiwala@hotmail.com)
  - 763-843-2556 (cell)



**Thank you**

