



# COMMERCIAL BANKING, CORP

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REQUEST FOR PROPOSAL

RFP #: IP – F1.H3

TITLE: BANKING INSURANCE PRODUCT – PHASE 3

CLOSING DATE AND TIME: SEPTEMBER 20, 2024 @ 5:00 PM

# Banking Insurance Product – Phase 3: IP – F1.H3

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## Purpose

By responding to this Request for Proposal (RFP), the Proposer agrees that s/he has read and understood all documents within this RFP package.

## Submission Details

Responders to this RFP should supply:

- A business report **up to 4 pages** (not including cover page, table of contents, or any needed appendix), including any supporting plots and tables.
- The commented code used to produce the results.

The report should address **all points described in the “Objective” section** below.

The report should be returned in the following way:

- Electronic (Submit via Moodle)

## Background

The Commercial Banking Corporation (hereafter the “Bank”), acting by and through its department of *Customer Services and New Products* is seeking proposals for banking services. The Bank ultimately wants to predict which customers will buy a variable rate annuity product.

A variable annuity is a contract between you and an insurance company / bank, under which the insurer agrees to make periodic payments to you, beginning either immediately or at some future date. You purchase a variable annuity contract by making either a single purchase payment or a series of purchase payments.

A variable annuity offers a range of investment options. The value of your investment as a variable annuity owner will vary depending on the performance of the investment options you choose. The investment options for a variable annuity are typically mutual funds that invest in stocks, bonds, money market instruments, or some combination of the three. If you are interested in more information, see: <http://www.sec.gov/investor/pubs/varannty.htm>

The project will be broken down into 3 phases:

- Phase 1 – Variable Understanding and Assumptions
- Phase 2 – Variable Selection and Modeling Building
- Phase 3 – Model Assessment and Prediction

## Objective

The scope of services in this phase includes the following:

- For this phase use **only** the binned data sets (both training and validation will be needed).

- Report the variables used in your final logistic regression model to predict the purchase of the new insurance product.
  - (HINT: Feel free to use the final model you had from the previous report or build a whole new model if you are not satisfied with your previous one. If building a new model, detail the process you took for variable selection.)
  - Rank each of the variables by p-value (one p-value per variable).
- Report and interpret the following probability metrics for your model on **training data**.
  - Concordance percentage.
  - Discrimination slope – provide the coefficient of discrimination as well as a visual representation through histograms.
- Report and interpret the following classification metrics for your model on **training data**.
  - Visually show the ROC curve.
    - (HINT: Although this is one of the **only** times I will allow a ROC curve in a report, make sure the axes are labeled well and the plot looks professional.)
  - K-S Statistic. The Bank currently uses the K-S statistic to choose the threshold for classification but are open to other methods as long as they are documented in the report and defended.
- Report and interpret the following classification metrics for your model on **validation data**.
  - Display your final confusion matrix.
  - Accuracy.
  - Lift – add a visual to help show the model performance.
- (HINT: These steps are here to help you build your model, but **not** to tell you which order to write your report. Consider the most important information when done with these questions and write your report accordingly.)

## Data Provided

The following two sets of data are provided for the proposal:

- The training data set **insurance\_t\_bin** contains 8,495 observations and 48 variables.
  - All of these customers have been offered the product in the data set under the variable **INS**, which takes a value of 1 if they bought and 0 if they did not buy.
  - There are 46 variables describing the customer's attributes **before** they were offered the new insurance product.
  - The Bank has strategically binned each of the continuous variables in the data set to help facilitate any further analysis.
- The validation data set **insurance\_v\_bin** contains 2,124 observations and 48 variables.
- The table below describes the Roles and Description of the variables found in both data sets.

<i>Name</i>	<i>Model Role</i>	<i>Description</i>
<i>ACCTAGE</i>	Input	Age of oldest account
<i>DDA</i>	Input	Indicator for checking account
<i>DDABAL</i>	Input	Checking account balance
<i>DEPAMT</i>	Input	Total amount deposited
<i>CASHBK</i>	Input	Number of cash back requests
<i>CHECKS</i>	Input	Number of checks written
<i>DIRDEP</i>	Input	Indicator for direct deposit
<i>NSF</i>	Input	Number of insufficient fund issues
<i>NSFAMT</i>	Input	Amount of NSF
<i>PHONE</i>	Input	Number of telephone banking interactions
<i>TELLER</i>	Input	Number of teller visit interactions
<i>SAV</i>	Input	Indicator for savings account
<i>SAVBAL</i>	Input	Savings account balance
<i>ATM</i>	Input	Indicator for ATM interaction
<i>ATMAMT</i>	Input	Total ATM withdrawal amount
<i>POS</i>	Input	Number of point of sale interactions
<i>POSAMT</i>	Input	Total amount for point of sale interactions
<i>CD</i>	Input	Indicator for certificate of deposit account
<i>CDBAL</i>	Input	CD balance
<i>IRA</i>	Input	Indicator for retirement account
<i>IRABAL</i>	Input	IRA balance
<i>LOC</i>	Input	Indicator for line of credit
<i>LOCBAL</i>	Input	LOC balance
<i>INV</i>	Input	Indicator for investment account
<i>INVBAL</i>	Input	INV balance
<i>ILS</i>	Input	Indicator for installment loan
<i>ILSBAL</i>	Input	ILS balance
<i>MM</i>	Input	Indicator for money market account
<i>MMBAL</i>	Input	MM balance
<i>MMCRED</i>	Input	Number of money market credits
<i>MTG</i>	Input	Indicator for mortgage
<i>MTGBAL</i>	Input	MTG balance
<i>CC</i>	Input	Indicator for credit card
<i>CCBAL</i>	Input	CC balance
<i>CCPURC</i>	Input	Number of credit card purchases
<i>SDB</i>	Input	Indicator for safety deposit box
<i>INCOME</i>	Input	Income
<i>HMOWN</i>	Input	Indicator for home ownership
<i>LORES</i>	Input	Length of residence in years
<i>HMVAL</i>	Input	Value of home
<i>AGE</i>	Input	Age

*CRSCORE*  
*MOVED*  
*INAREA*  
*INS*  
*BRANCH*  
*RES*

Input	Credit score
Input	Recent address change
Input	Indicator for local address
Target	Indicator for purchase of insurance product
Input	Branch of bank
Input	Area classification