# Scoring Model

Our scoring model will work by assigning penalties and rewards to different variables that affect the Merchant. Our system should be able to let us select ANY of the fields in the system as variables for the scoring, and then assign the limits, penalties and rewards.

The score will be calculated as a number, and then the system will assign a letter depending on the numeric score. Every merchant will start with a score of 800 (we should be able to modify this initial value), and then, depending on the affecting variables it will decrease or increase.

Scores from 600 or greater will be A. From 400 or greater, but less than 600, will be B. From 200 or greater, but less than 400, will be C. Anything below 200 will be D.

# The Variables

As discussed before, we should be able to select any variable form our system as a variable that will affect the score. The variables we want right now (so that you can have an idea of what we will use from the start, even if we modify it later) are:

## Property

This variable is whether the property of the business is owned or rented.

## Growth

For this variable you need to understand first what a moving average is. What we do is, from the volumes we receive from the processor, we create a moving average with a lag of 3. What that means is that the moving average will calculate the average for every period and the two periods before it. For example: if we have a merchant with volumes as follow:

RD$ 4,854.00

RD$ 254,908.85

RD$ 169,259.05

RD$ 233,442.63

RD$ 243,734.50

RD$ 175,145.50

RD$ 237,719.00

RD$ 196,889.00

RD$ 183,956.75

RD$ 164,424.66

RD$ 217,350.00

RD$ 223,011.24

The first period of the moving average would be RD$ 143,007.30, which is the average for the first three months of the volumes (RD$ 4,854, RD$ 254,908.85, RD$ 169,259.05), the second period of the moving average will be the average of the second, third and fourth month. The third period would be the averages of the third, fourth and fifth month. And so on. In the end, you should have the moving average as this:

1 RD$ 143,007.30

2 RD$ 219,203.51

3 RD$ 215,478.73

4 RD$ 217,440.88

5 RD$ 218,866.33

6 RD$ 203,251.17

7 RD$ 206,188.25

8 RD$ 181,756.80

9 RD$ 188,577.14

10 RD$ 201,595.30

To calculate the growth you have to calculate the Slope of the moving averages and divide that by the Average Credit Card Sales of the volumes. You will have the Growth Percentage.

The formula of the slope is this:

Equation

Where X is the number of the period (for example, period number 9 has an amount of RD$ 188,577.14) and Y is the amount.

So in this case, if you calculate the average of the volumes you will get RD$ 195,057.93 and if you calculate the slope, you will get 575.3. So the growth percentage would be about 0.3 %( 575.3 / RD$ 195,057.93)

## Variation Coefficient

To calculate this you need to first calculate the Standard Deviations of the volumes and divide that by the Average CC Sales.

This is the formula:

Formula

X is the amounts of the volumes.

If we use the amounts from the previous example, we know that the average is RD$ 195,057.93. If we use the formula to calculate the standard deviation, we should get 34.65%.

## Time in operation

This is the time the business has been open at the time of the evaluation (Evaluation Date – Business Start Date).

## Industry

This is the type of industry of the Merchant.

**0 Months**

This is the amount of months the merchant didn’t register any credit card transactions:

RD$ 4,854.00

RD$ 254,908.85

RD$ 169,259.05

RD$ 0

RD$ 243,734.50

RD$ 175,145.50

RD$ 0

RD$ 196,889.00

RD$ 183,956.75

RD$ 0

RD$ 217,350.00

RD$ 223,011.24

For example, here the merchant would have 3 0 months.

# The Limits

The limits are the ranges the penalties and rewards will be assigned to. For example, if we have the Variation Coefficient as a variable and we choose three limits as follows: 10%, 7% and 2%, then 10% will be limit 1, 7% will limit 2% will be limit 3. Penalty 1 will be applied to all those merchants whose Variation coefficient is greater than limit 1, penalty 2 to those whose V.C. is greater than limit 2, and so on.

It’s important to keep in mind that we should be able to change ALL limits and penalties. We could add as many limits as needed.

## Property

This variable will have only one limit. If the property is owned it will have a penalty of -100 (which is a reward of 100, so if the merchant has a score of 800 and it’s owned, it will be 900) and if it’s rented will have a penalty of 100 (if the initial score is 800 and it’s rented, the score will be 700).

## Growth

This variable will have five limits.

Limit 1 – (-10%)

Limit 2 – (-7%)

Limit 3 – (-5%)

Limit 4 – (-2%)

Limit 5 – (-0%)

The penalties are as follows:

Penalty 1 – 800

Penalty 2 – 600

Penalty 3 – 500

Penalty 4 – 400

Penalty 5 – 200

This means that if the Growth percentage is less than -10% (for example, -10.5% or -11%) then it will take 800 from the score; If it’s less than -7% and greater or equal than -10%, it will take 600 from the score.; If it’s less than -5% and greater or equal than -7%, it will take 500 from the score, and so on.

In the example given before, with a growth percentage of 0.3%, the penalty will be 0, because it’s greater than 0%.

## Variation Coefficient

This will also have five limits and five penalties.

Limit 1 – 100%

Limit 2 – 75%

Limit 3 – 65%

Limit 4 – 55%

Limit 5 – 10%

The penalties are as follows:

Penalty 1 – 600

Penalty 2 – 500

Penalty 3 – 400

Penalty 4 – 300

Penalty 5 – 200

This means that if the Variation is greater than 100% then it will take 600 from the score; if it’s greater than 75% but 100% or less, it will take 500; if it’s greater than 65% but 75% or less, it will take 400, and so on.

In the example given before, with a variation of 34.65%, it would take 200 from the score.

## Time in operation

Limit 1 – <1

Limit 2 – 1

Limit 3 – 5

Limit 4 – 10

The penalties are as follows:

Penalty 1 – 400

Penalty 2 – 0

Penalty 3 – (-200)

Penalty 4 – (-400)

This means that if the business has 1 year or less open, it will take 400 from its score; if it has more than 1 year, but 5 or less, it will neither take nor give; if it has more than 5 years, but 10 or less, it will give *200* to the score; if it has more than 10 years, it will *give* 400.

## Industry

With this variable the system would take or give points depending on the type of industry of the merchant.

These are the affecting industries:

1. Hotels
2. Drinking Places
3. Restaurants
4. Beauty Salons
5. Supermarkets
6. Minimarkets (These are colmados in Spanish, not quite a minimarket, but something close to it)
7. Travel Agencies

The penalties are as follows:

Penalty 1 – 100

Penalty 2 – 100

Penalty 3 – 200

Penalty 4 – (-200)

Penalty 5 – 200

Penalty 6 – (-100)

Penalty 7 – (200)

This means that Hotels will be automatically taken off 100 points from the score; drinking places will be taken off 100; Restaurants will be taken off 200; beauty salons will be *given* 200; Supermarkets will be taken 200; Minimarkets will be *given* 100 and travel agencies will be taken 200.

## 0 months

If the volumes have 1 month in 0, it will take 100 from the score; if it has 2, it will take 200; if it has 3, it will take 300; if it has 4, it will take 400; if it has 5 or more, it will take 600.

## Notes:

Please keep in mind that we need this model to be as flexible as possible, where we can add as many limits as needed and as many variables that the system has available to us as possible.

This part is extremely important for the expansion and growth plans we have for the business and it needs to be something we can change on the fly.