

Retail risk management

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Content

1. Lending process.

- Underwriting, fraud prevention, pricing

2. Decision Making

- Scoring

3. Analyst

- NPL, FSTPD, RollRate, Vintage

4. Portfolio assessment model

- simple model

5. Collection

- collection rate

The task of the retail RM – to control process of retail lending for minimization possible losses.

The life cycle of the loan portfolio:

1. Lending.

- Manager, Underwriting Department, Security Dep.

2. Decisions.

- Scoring, Credit Committee

3. Portfolio Cash flow

- Analyst

4. Problem debt

Problem debt Department (Collection)

1. Lending

Tasks:

- 1) Make the database
(copies of the official documents, property, family, income, employment, Credit history)
- 2) Cut-off simple fraud
(People will not pay a loan from today)

Responsible: Manager, Underwriting Dep., Security Dep.

Personal
data,
Documents,
Copies,

correctness of the
copies,
Credit History
Bureau

Verification,
Fraud BASEs

Tasks

Manager

- Identification of the client
- purpose of the loan
- Misleading
- *Documents, Copies*

Underwriting Dep.

- correctness of the copies (the right person, the right pages)
- *possible Decision Making*

Security Dep

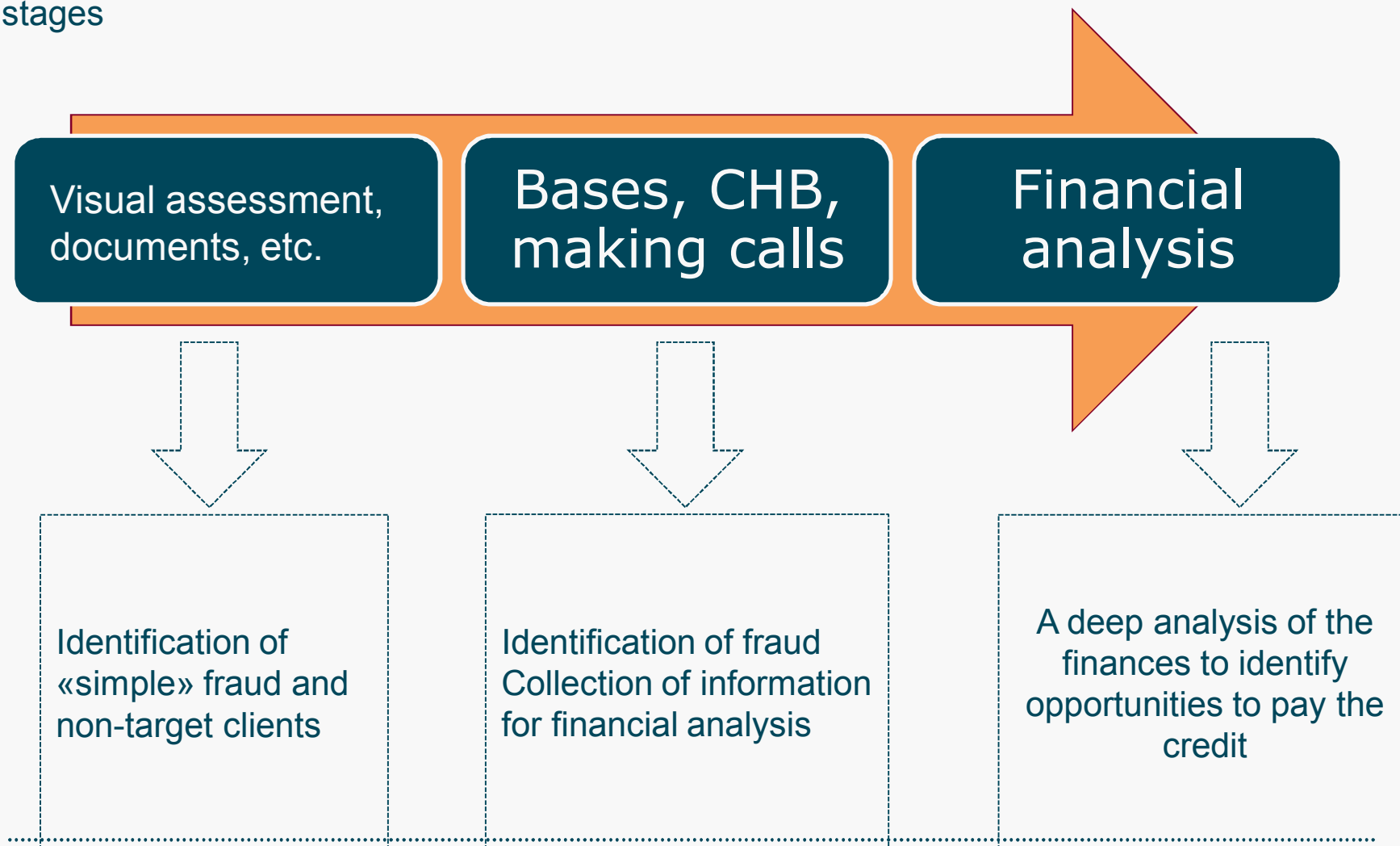
- Forgery
- False information
- Coercion to credit, intimidation

Un+Sec

- Checking addresses, phone numbers, places of work (verification)
- Checking BASEs
- Credit History Bureau

Decision Making

stages



Financial analysis

Condition

The client has passed all checks. No Obstacles for the loan.

Process of the financial analysis.

Objectives :

1. The ability of the client to service the loan.
Is it enough income to make payments.

Decision - Ratios of Debt To Income (DTI)

Note: salary, all other income, family cost, region specifics

2. Pricing with risks.
higher the PD => higher interest rate.

Decision - Scoring

Scoring

credit quality assessment

some transformation, transfers multidimensional information in a scalar (PD, ScorRate, rating)

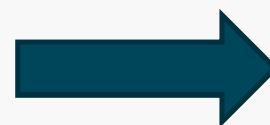
a lot of STATISTIC & a lot of DEFAULT

- $F(\text{income, age, work place...}) \Rightarrow \text{ScorRate}$

-

X1	X2	X3	X4	X5	***
age	income	CredHisto	Work	Auto	***
21	100	0	10	1	
45	50	1	9	1	**
66	70	1	5	1	**
55	90	2	7	1	**
56	150	1	7	0	
36	33	1	9	1	
37	56	2	5	1	
42	45	2	6	0	
28	12	0	14	1	
42	22	1	5	1	

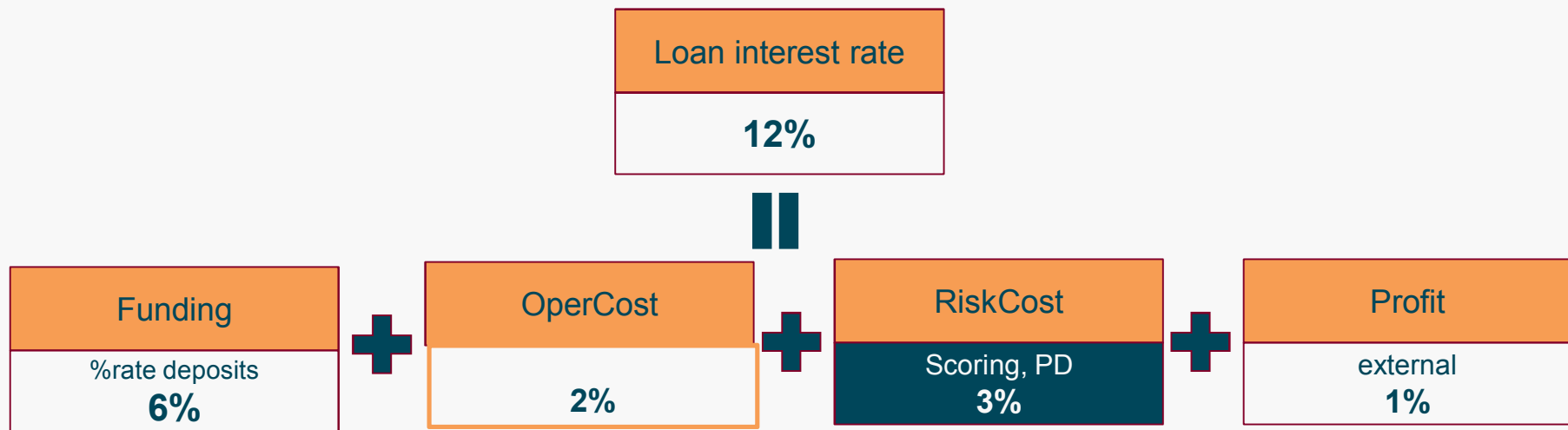
$$f(x) = \frac{1}{1 + e^{-x}}$$



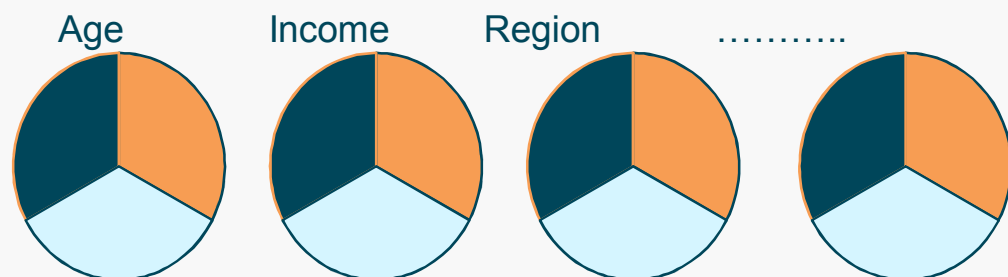
ScorRate	PD	Rating
-	-	-
10	90%	C
20	80%	C
55	45%	B
33	67%	C
99	1%	A
18	82%	C
20	80%	C
30	70%	C
40	60%	C
50	50%	B

- **Output**
- 1) OK/REJECT
- 2) conditions (amount, %rate, Commission)

Pricing



3. Portfolio Analytics



The main control - **the overdue of payments (default)**

The accounting approach - provisions.



Task: to correctly determine the percentage of losses

Rus Stand-s

Overdue	%prov
0	0,5
1-30	1,5
31-90	10
91-180	35
181-360	75
360+	100

NPL (Non-performing loan)

- Loan in default (or likely to fall into the default)

In practice - overdue more than 90 days

Portfolio	overdue 90+	NPL, \$	NPL, %
\$200	\$15	\$15	7,5%

FSTPD

- loan in default with the **F**irst, **S**econd, **T**hird payment

Characterizes the level of fraud

issued loans	0 payments (FPD)	1 payments (SPD)	2 payment (TPD)	FSTPD
\$200	\$1 0,5%	\$3 1,5%	\$5 2,5%	\$9 4,5%

Vintage

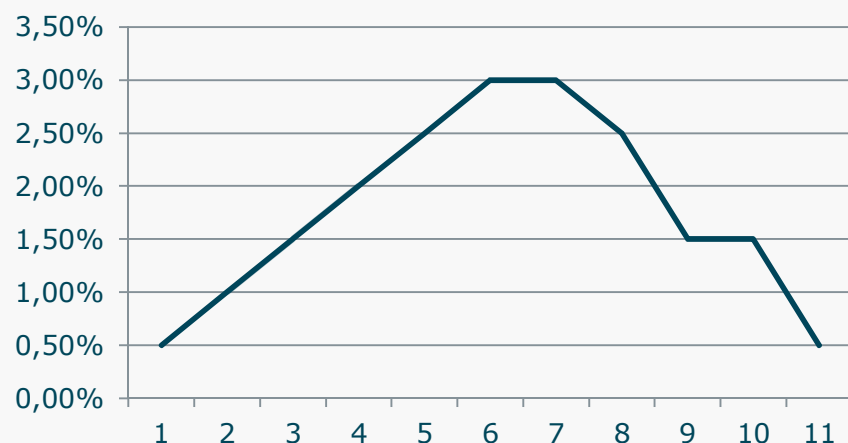
-the level of overdue in time

Parameters:

- month of issuing
- period of overdue

Example: 01/2012 issued \$200

date	01/02	01/03	01/04	01/05	01/06	01/07	01/08	01/09	01/10	01/11	01/12	01/01/ 13
Age	0	1	2	3	4	5	6	7	8	9	10	11
0+	-	\$1	\$2	\$3	\$4	\$5	\$6	\$6	\$5	\$3	\$3	\$1
Vin0+	-	0,5%	1,0%	1,5%	2,0%	2,5%	3,0%	3,0%	2,5%	1,5%	1,5%	0,5%

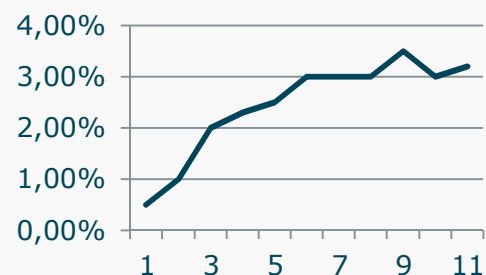


Total Vintage

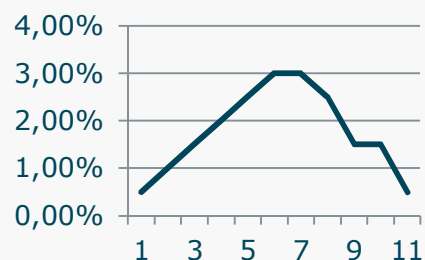
Date	sum	2,00	3,00	4,00	5,00	6,00	7,00	8,00	9,00	10,00	11,00	12,00	13,00
01/12	1 862 000	07%	11%	12%	12%	12%	12%	12%	13%	13%	13%	14%	12%
02/12	6 225 600	06%	09%	09%	10%	10%	10%	10%	10%	11%	11%	13%	
03/12	5 297 900	08%	11%	10%	10%	10%	10%	11%	11%	12%	12%		
04/12	1 036 700	07%	08%	07%	08%	08%	08%	09%	10%	11%			
05/12	944 500	04%	05%	05%	05%	05%	06%	06%	06%				
06/12	1 217 500	02%	03%	03%	03%	03%	04%	04%					
07/12	1 717 000	01%	02%	03%	03%	05%	05%						
08/12	1 875 200	01%	02%	03%	04%	05%							
09/12	1 513 000	01%	02%	03%	04%								
10/12	4 734 956	01%	03%	03%									
11/12	1 911 396	02%	03%										
12/12	1 778 479	02%											

Vintage specification

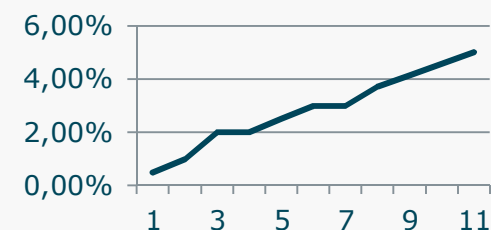
- ordinary



“mount”



rising



BucketX+

-X number of overdue payments

overdue	0	1-30	31-60	61-90	91-120	121-150	151-180	>180
Bucket	Bucket0	Bucket1	Bucket2	Bucket3	Bucket4	Bucket5	Bucket6	Bucket7
Bucket	Bucket0	Bucket0+	Bucket30+	Bucket60+	Bucket90+	Bucket120+	Bucket150+	Bucket180+

RollRate

- Portion (*probability*), which goes to the next bucket of overdue.

	Buc0 (0)	Buc1 (1-30 d)	Buc2 (31-60 d)	Buc3 (61-90 d)	...
06.10	1 000	25	12	9	
07.10	1 050	30	15	10	
08.10	1 200	31	15	12	
09.10	1 300	60	18	10	

$$RR(X) = \text{BucX}(\text{dateT}) / \text{BucX-1}(\text{dateT-1})$$

	RR1	RR2	RR3	...	...
07.10	3%=30/1000	60%	83%		
08.10	3%	50%=15/30	80%		
09.10	5%	58%	67%=10/15		

RollRate2 ("PD culc")

Calculate average RR (for example, simple average)

RR1	RR2	RR3	RR4	RR5	RR6	RR7
5%	50%	60%	80%	90%	100%	100%

Calculate the «Probability» of the migration in the default bucket (90+)

$$\text{PD Bucket0} = 0,05 * 0,5 * 0,6 * 0,8 = 1,2\%$$

$$\text{PD Bucket0+} = 0,5 * 0,6 * 0,8 = 24\%$$

$$\text{PD Bucket30+} = 0,6 * 0,8 = 48\%$$

$$\text{PD Bucket60+} = 0,8 = 80\%$$

These PDs can be considered as IFRS rates of reserve*

*- With adjustments to LGD, EAD.

Portfolio assessment model

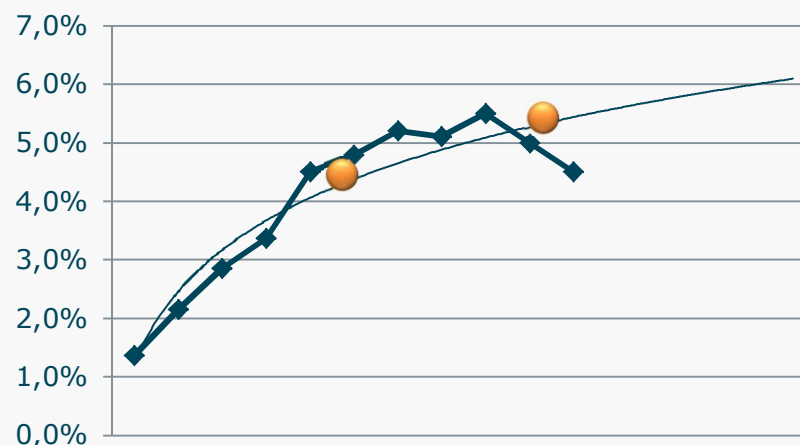
Parameters:

- only non default loans.
- sufficient statistics (RR, vintages, other data are present).
- there are no new credits
- a portfolio of homogeneous (for example, only car loans).
- default = default of 90+

steps

- 1) calculation of the Vintage90+
- 2) smoothing and forecasting by Log-trend $(y = 0,0175\ln(x) + 0,0125)$
- 3) calculation monthly rate of growth of the PD

$$MPD = Vin(x+1) - Vin(x)$$



age	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Vin90+	1,4%	2,2%	2,8%	3,4%	4,5%	4,8%	5,2%	5,1%	5,5%	5,0%	4,5%				
Trend	1,3%	2,5%	3,2%	3,7%	4,1%	4,4%	4,7%	4,9%	5,1%	5,3%	5,4%	5,6%	5,7%	5,9%	6,0%
MPD	1,2%	0,7%	0,5%	0,4%	0,3%	0,3%	0,2%	0,2%	0,2%	0,2%	0,2%	0,1%	0,1%	0,1%	

Rate of growth Vintage

age	4	5	6	7	8	9	10	11	12	13	14	15
Vin90+	1,4%	2,2%	2,8%	3,4%	4,5%	4,8%	5,2%	5,1%	5,5%	5,0%	4,5%	
Trend	1,3%	2,5%	3,2%	3,7%	4,1%	4,4%	4,7%	4,9%	5,1%	5,3%	5,4%	5,6%
Месячная PD	1,2%	0,7%	0,5%	0,4%	0,3%	0,3%	0,2%	0,2%	0,2%	0,2%	0,2%	0,1%

$Vin(x+K) - vin(x) = PD$ for credit of the age of **X** on the horizon **K** months

FOR 6 months credit on the horizon 5m: $PD = 4.9\% - 3.2\% = 1.7\%$

Credit Portfolio CF

Дата	Age			Age		Age	
01.01.2013	8	100		9	200	6	100
01.02.2013	9	100		10	200	7	90
01.03.2013	10	100		11	200	8	80
01.04.2013	11	100		12	200	9	70
01.05.2013	12	100		13	200	10	60
01.06.2013	13	100		14	200	11	50
01.07.2013	14	100		15	200	12	40
01.08.2013				16	200	13	30
01.09.2013				17	200	14	20
01.10.2013						15	10

Age	Vin	MPD
4	1,25%	1,21%
5	2,46%	0,71%
6	3,17%	0,50%
7	3,68%	0,39%
8	4,07%	0,32%
9	4,39%	0,27%
10	4,66%	0,23%
11	4,89%	0,21%
12	5,10%	0,18%
13	5,28%	0,17%
14	5,45%	0,15%
15	5,60%	0,14%
16	5,74%	0,13%
17	5,87%	0,12%

Дата	Age	CF	MPD	RCF	Age	CF	MPD	RCF	Age	CF	MPD	RCF	TRCF			
01.13	8	100	0,32%	99,68	9	200	0,27%	199,46	6	100	0,50%	99,50	398,6		Age	Vin
02.13	9	100	0,27%	99,73	10	200	0,23%	199,53	7	90	0,39%	89,65	388,9		4	1,25%
03.13	10	100	0,23%	99,77	11	200	0,21%	199,59	8	80	0,32%	79,74	379,1		5	2,46%
04.13	11	100	0,21%	99,79	12	200	0,18%	199,63	9	70	0,27%	69,81	369,2		6	3,17%
05.13	12	100	0,18%	99,82	13	200	0,17%	199,67	10	60	0,23%	59,86	359,3		7	3,68%
06.13	13	100	0,17%	99,83	14	200	0,15%	199,70	11	50	0,21%	49,90	349,4		8	4,07%
07.13	14	100	0,15%	99,85	15	200	0,14%	199,72	12	40	0,18%	39,93	339,5		9	4,39%
08.13					16	200	0,13%	199,74	13	30	0,17%	29,95	229,7		10	4,66%
09.13					17	200	0,12%	199,76	14	20	0,15%	19,97	219,7		11	4,89%
10.13									15	10	0,14%	9,99	9,99		12	5,10%
11.13															13	5,28%
12.13															14	5,45%
01.14													- 3 000,0		15	5,60%
02.14													10%		16	5,74%
03.14															17	5,87%
04.14															18	5,99%

- $RCF = CF * (1 - MPD)$

financial analysis

- IRR (-3000, TRCF) (3,8%)
- NPV (TRCF, 10%) (2 930)

Collection

Two types of work with problem debts

- 1. inside the Bank (telephone impact, departures, judgments)
- 2. selling of the problem debts (in other banks, collection agencies)

The main numerical indicator

The collection rate (Rate of return)

RC = received funds / problem debts.

(LGD Analog)

example:

default portfolio = 100

payments in the current month = 35,

RC = $35/100 = 35\%$.

Collection 2

different types of RC



By overdue: RC(0+), RC(90+), RC(360+)...



By loan program: RC(car), RC(PIL), RC(cards)...



By region: RC(Moscow), RC(Ural), RC(Siberia)...



By influence: RC(e-mail), RC(phone), RC(home visit)...

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In **portfolio assessment model** RC used as additional coefficients for overdue credits.

Thank you

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