



# CITI Bank Credit Card Rebate Project

By CITI Group 2 :  
Yiling Chen, Zhihan Dong, Xinying Gao, Qingyue Lei, Xi Lu



# Section 1 BACKGROUND

## CASE OBJECTIVES

- *How The Profit Changes with The Change of Rebate Level?*
- *How To Reach That Optimized Level?*

## Executive Summary

<sup>1</sup> Prior information of the CITI Bank's "Private Label" credit cards were based on the "CITI Credit Card Project Overview". This study refers throughout to those prior studies.

# Section 1 BACKGROUND

Citibank

Graphic design for animation

AnimacjaReklamowa.pl | KiooiK



## CASE OBJECTIVES

- *How The Profit Changes with The Change of Rebate Level?*
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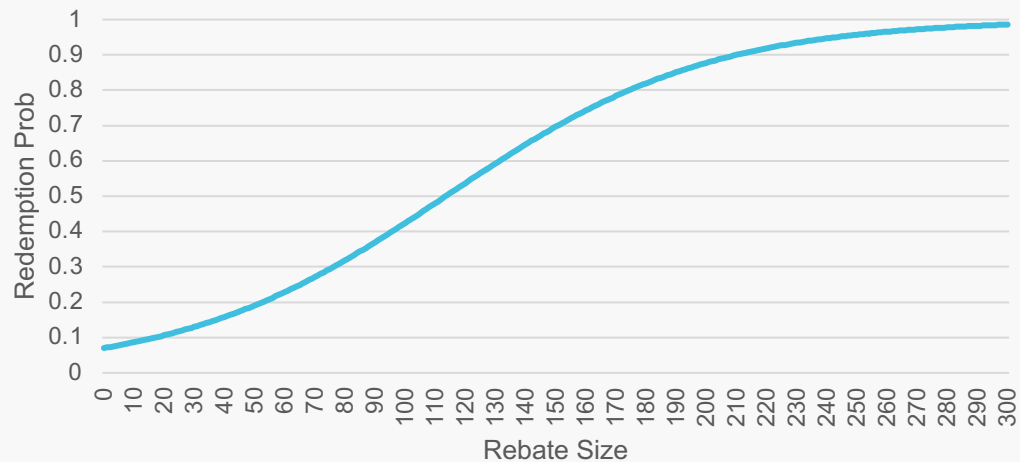
# 02 Data & Regression Models



CITI Redemption.csv

- $P(\text{Redeem Expost} = 1) = \frac{\exp(U)}{1 + \exp(U)}$
- $U = -2.622 + 2.277e - 02 * \text{RebateSize} + 1.589e - 03 * \text{TimeLimit} + 1.187e - 05 * \text{CarPrice} + (-2.847e - 04) * \text{ActualPmtAmt}$

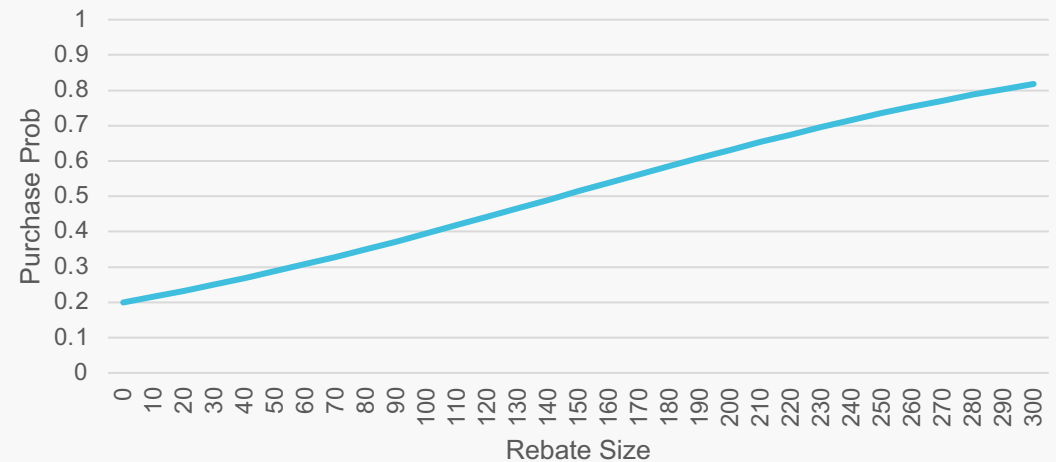
Redemption



CITI Choice.csv

- Multilogit = mlogit(Buy ~ RebateSize, data = choice)

Purchase



# 03 Profit Maximum when Rebate Size at \$130 Level

 **28000**  
Customer Annually

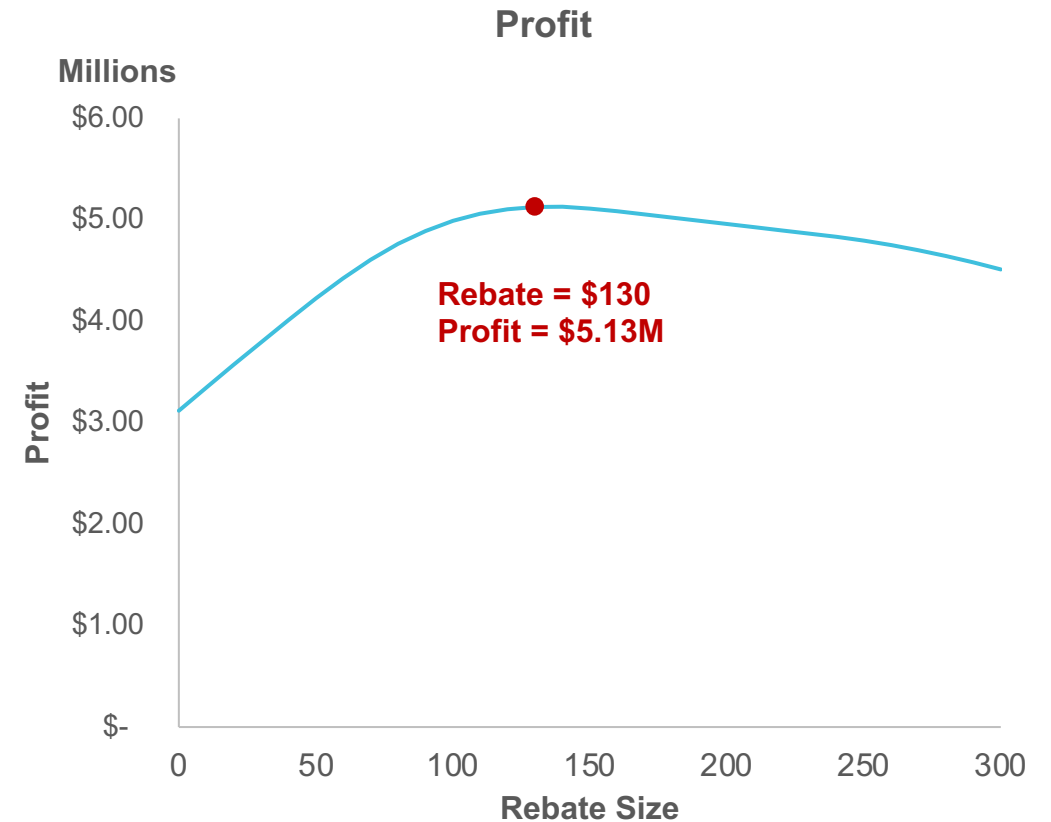
 **\$558.469**  
Avg Payment Amount

$\text{Cost} = \text{Rebate} * \text{Redemption Prob} * 28,000$

$\text{Revenue} = 558.469 * \text{Purchase Prob} * 28,000$

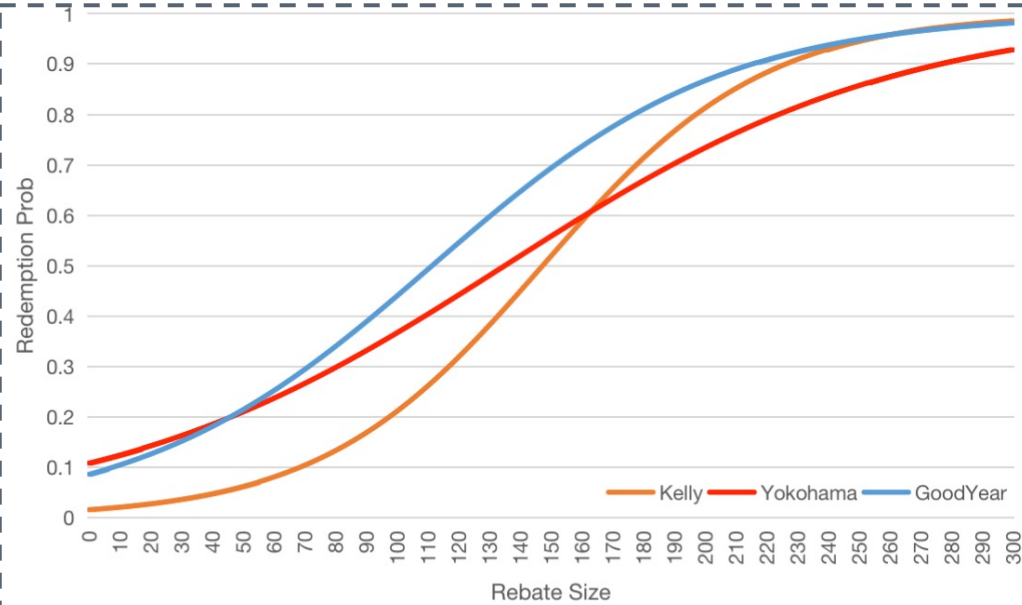
$\text{Profit} = \text{Revenue} - \text{Cost}$

Max when rebate size = \$130



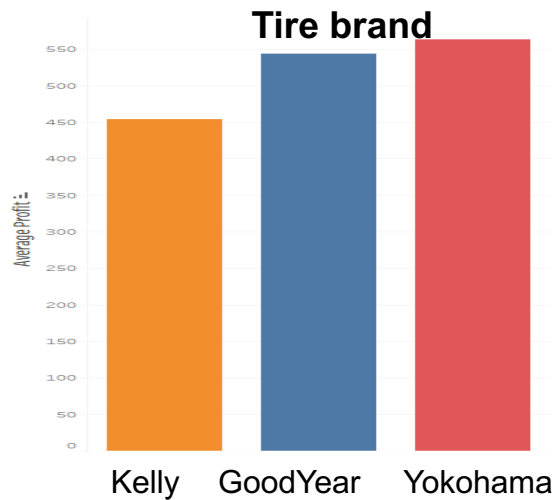
# 04

## Rebate Size for Yokohama should be more than 130



- **Rebate Amount Sensitivity:**  
Kelly > GoodYear > **Yokohama**

Yokohama customers are the least likely to redeem as rebate amount increases



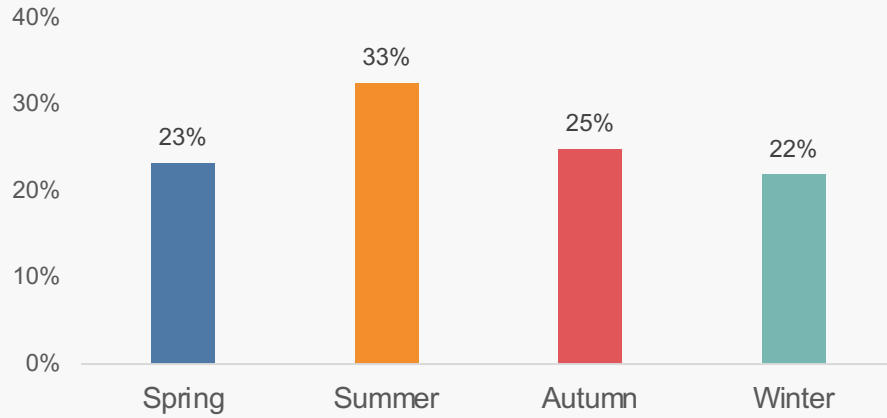
- **Profit per Transaction:**  
**Yokohama** > GoodYear > Kelly

Yokohama has the highest profit

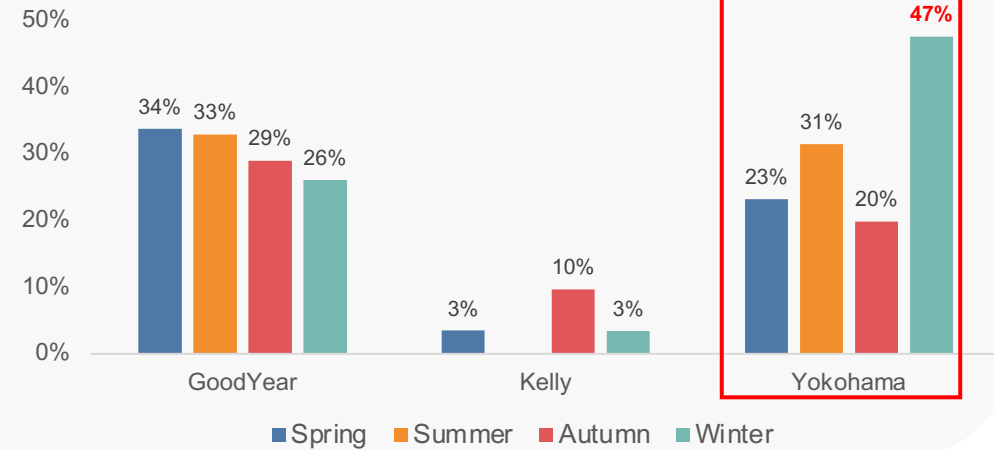
Yokohama  
Rebate  
Amount  
> \$130

- On Average, Winter Has Lowest Redemption Rate

Redemption Rate (All)

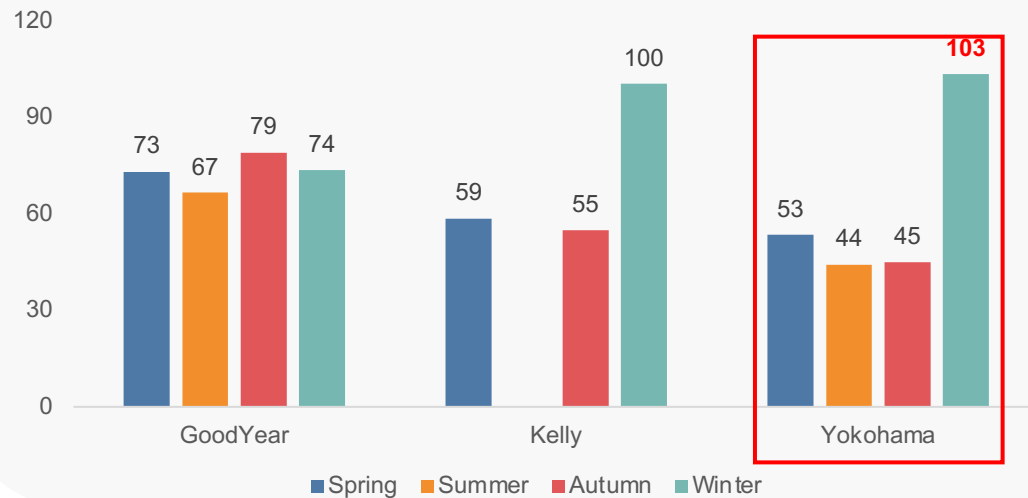


Redemption Rate (Brand)

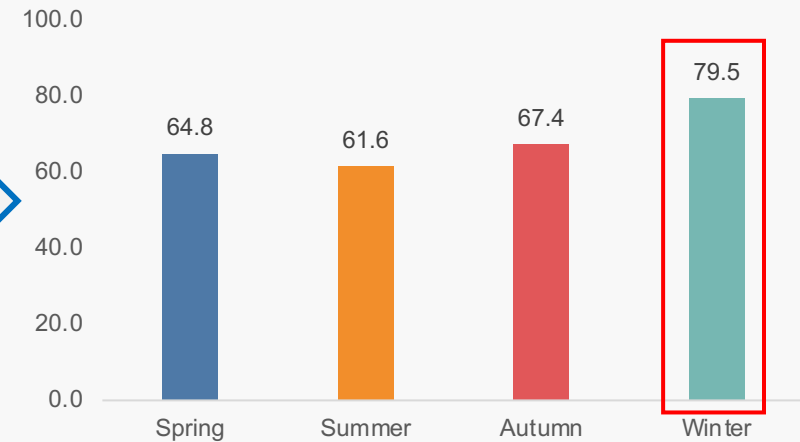


- Yokohama's Time Limit Too High

Time Limit (Brand)



Time Limit (All)



# 06 Conclusion

01

## Objective

- At What **Rebate** Level Will Citi Has Largest Profit
- How To Reach That Optimized Level

02

## Methodology

Regression Model  
Descriptive Analysis

03

## Insights

- Profit max when rebate size at \$130 levels
- Rebate size for Yokohama can increase most
- Decrease the time limit for Yokohama in Winter





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# APPENDIX WITH SUPPLEMENTARY DATA

```
## kelly
bilogit_kelly <- glm(RedeemExpost ~ ActualPmtAmt + CarPrice+ RebateSize + TimeLimit , data = subset(citi, TireBrand=='kelly'), family =
"binomial")
summary(bilogit_kelly)
## Yokohama
bilogit_Yokohama <- glm(RedeemExpost ~ ActualPmtAmt + CarPrice+ RebateSize + TimeLimit , data = subset(citi, TireBrand=='Yokohama'), family =
"binomial")
summary(bilogit_Yokohama)
## GoodYear
bilogit_GoodYear <- glm(RedeemExpost ~ ActualPmtAmt + CarPrice+ RebateSize + TimeLimit , data = subset(citi, TireBrand=='GoodYear'), family =
"binomial")
summary(bilogit_GoodYear)
```

RebateSize	PurchaseProb	Redemption_Prob	ActPmtAmt	Revenue	Cost	Profit
0	0.199408954	0.07022005	\$ 558.47	\$ 3,118,184.13	\$ -	\$ 3,118,184.13
10	0.215247737	0.08662057	\$ 558.47	\$ 3,365,857.27	\$ 24,253.76	\$ 3,341,603.51
20	0.231980038	0.106413179	\$ 558.47	\$ 3,627,502.47	\$ 59,591.38	\$ 3,567,911.09
30	0.249599327	0.130084248	\$ 558.47	\$ 3,903,017.63	\$ 109,270.77	\$ 3,793,746.86
40	0.268089707	0.158089276	\$ 558.47	\$ 4,192,154.14	\$ 177,059.99	\$ 4,015,094.15
50	0.287425197	0.190800969	\$ 558.47	\$ 4,494,505.75	\$ 267,121.36	\$ 4,227,384.39
60	0.3075692	0.22844472	\$ 558.47	\$ 4,809,500.19	\$ 383,787.13	\$ 4,425,713.06
70	0.328474198	0.271027826	\$ 558.47	\$ 5,136,394.39	\$ 531,214.54	\$ 4,605,179.85
80	0.350081701	0.318274239	\$ 558.47	\$ 5,474,273.78	\$ 712,934.30	\$ 4,761,339.48
90	0.372322508	0.369581158	\$ 558.47	\$ 5,822,056.21	\$ 931,344.52	\$ 4,890,711.69
100	0.395117269	0.424014687	\$ 558.47	\$ 6,178,500.90	\$ 1,187,241.12	\$ 4,991,259.78
110	0.418377385	0.480356598	\$ 558.47	\$ 6,542,222.40	\$ 1,479,498.32	\$ 5,062,724.07
120	0.442006211	0.537202601	\$ 558.47	\$ 6,911,709.46	\$ 1,805,000.74	\$ 5,106,708.72
130	0.465900552	0.593097675	\$ 558.47	\$ 7,285,348.44	\$ 2,158,875.54	\$ 5,126,472.90
140	0.489952403	0.646681945	\$ 558.47	\$ 7,661,450.40	\$ 2,534,993.22	\$ 5,126,457.18
150	0.514050863	0.696816935	\$ 558.47	\$ 8,038,281.19	\$ 2,926,631.13	\$ 5,111,650.06
160	0.538084168	0.742668746	\$ 558.47	\$ 8,414,093.16	\$ 3,327,155.98	\$ 5,086,937.18
170	0.561941762	0.783738303	\$ 558.47	\$ 8,787,157.51	\$ 3,730,594.32	\$ 5,056,563.18
180	0.585516307	0.819843261	\$ 558.47	\$ 9,155,795.78	\$ 4,132,010.03	\$ 5,023,785.75
190	0.608705585	0.851065937	\$ 558.47	\$ 9,518,409.58	\$ 4,527,670.79	\$ 4,990,738.79
200	0.63141419	0.87768477	\$ 558.47	\$ 9,873,507.04	\$ 4,915,034.71	\$ 4,958,472.33
210	0.653554986	0.900104473	\$ 558.47	\$ 10,219,725.58	\$ 5,292,614.30	\$ 4,927,111.28
220	0.675050256	0.918794979	\$ 558.47	\$ 10,555,849.96	\$ 5,659,777.07	\$ 4,896,072.88
230	0.695832547	0.934243951	\$ 558.47	\$ 10,880,825.38	\$ 6,016,531.05	\$ 4,864,294.34
240	0.715845184	0.946923595	\$ 558.47	\$ 11,193,765.64	\$ 6,363,326.56	\$ 4,830,439.08
250	0.735042475	0.957270069	\$ 558.47	\$ 11,493,956.20	\$ 6,700,890.49	\$ 4,793,065.72
260	0.753389614	0.965672764	\$ 558.47	\$ 11,780,852.85	\$ 7,030,097.72	\$ 4,750,755.13
270	0.770862341	0.972470616	\$ 558.47	\$ 12,054,076.17	\$ 7,351,877.86	\$ 4,702,198.31
280	0.787446365	0.977953018	\$ 558.47	\$ 12,313,402.76	\$ 7,667,151.66	\$ 4,646,251.09
290	0.803136637	0.982363416	\$ 558.47	\$ 12,558,753.60	\$ 7,976,790.94	\$ 4,581,962.66
300	0.817936474	0.98590425	\$ 558.47	\$ 12,790,180.62	\$ 8,281,595.70	\$ 4,508,584.92