Goal: set an optimal price per segment

Global constraint:

Sum\_segment E(loan amount|segment, price\_segment) < B

Global objective:

Sum\_segment E(profit|segment, price\_segment)

For a given segment, to estimate E(Loan amount|segment, price),

We use the data to get the empirical distribution of the loan amounts. Then

E(loan amount|segment, price) ~= sum\_{booking\_i in this segment} P(booking|price, segment, booking loan amount)\*loan amount\_{booking\_i}

E(profit|segment, price) ~= sum\_{booking\_i in this segment} P(booking|price, segment, booking loan amount)\*Profit\_{booking\_i}

Profit\_{booking\_i}=price-cost\_{booking\_i}

The end product of this optimization is a global price.

To optimize for a price per segment,

Global constraint:

Sum\_segment E(loan amount|segment, price, prices) < B

Global objective:

Sum\_segment E(profit|segment, price)

For a given segment, to estimate E(Loan amount|segment, price),

We use the data to get the empirical distribution of the loan amounts. Then

E(loan amount|segment, price) ~= sum\_{booking\_i in this segment} P(booking|price, segment, booking loan amount)\*loan amount\_{booking\_i}

E(profit|segment, price) ~= sum\_{booking\_i in this segment} P(booking|price, segment, booking loan amount)\*Profit\_{booking\_i}

Profit\_{booking\_i}=price-cost\_{booking\_i}

Logit(booking)=beta\_0+beta\_1\*price+ beta\_2segment+beta\_3\*loanA +(beta\_4segment)\*price

The design matrix of this model is

J, price, segment\_1, segment\_2, segment\_3, loanA, price\*segment\_1, price\*segment\_2, price\*segment\_3

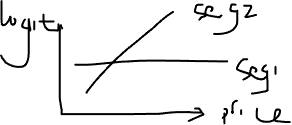
P(booking|price, segment, booking loan amount)=beta\_0+beta\_1\*price + beta\_2segment+beta\_3\*loanA +beta\_41\*price\*segment\_1+beta\_42\*price\*segment\_2

To test price for segment 1 at 2%, price for segment 2 at 2.5%, price for segment 3 at 3%



We calculate

Logit(P(booking|price, segment=1, booking\_i loan amount))= beta\_0+beta\_1\* 2%+beta\_21+beta\_3\*loanA\_i+beta\_41\*2%



In the end, the global objective is

Sum\_s{sum\_i P(success|price\_s, s, loanA\_i)\*(price\_s-cost\_i)}

The global constraint is

Sum\_s{sum\_i P(success|price\_s, s, loanA\_i)\*loanA\_i} < B

Build a simple logistic regression model per segment using the data from that segment only. The model is denoted as P(success|price\_s, s). The loan amount and the cost are assumed to be constant within a segment, denoted as loanA\_s and cost\_s

The global objective is

Sum\_s{P(success|price\_s, s)\*(price\_s-cost\_s)}

The global constraint is

Sum\_s{P(success|price\_s, s)\*loanA\_s} < B