Exercise 1

Average and dispersion in product characteristics.

Market share, and market share by product characteristics.

```
Market share by choice frequency(not include price)
```

Market share by choice frequency(include price)

```
choice frequency by price bins: below average, over average
```

Illustrate the mapping between observed attributes and choices.

^	hhid [‡]	choice [‡]	Income [‡]	Fs3_4 [‡]	Fs5.	Fam_Size [‡]	college [‡]	whtcollar [‡]	retired
1	2100016	1	32.5	0	0	2	1	0	1
2	2100016	1	32.5	0	0	2	1	0	
3	2100016	1	32.5	0	0	2	1	0	
4	2100016	1	32.5	0	0	2	1	0	
5	2100016	1	32.5	0	0	2	1	0	
6	2100016	4	32.5	0	0	2	1	0	
7	2100016	1	32.5	0	0	2	1	0	
8	2100024	1	17.5	1	0	3	1	1	
9	2100024	4	17.5	1	0	3	1	1	
10	2100024	1	17.5	1	0	3	1	1	
11	2100024	4	17.5	1	0	3	1	1	
12	2100024	8	17.5	1	0	3	1	1	
13	2100024	4	17.5	1	0	3	1	1	
14	2100024	3	17.5	1	0	3	1	1	
15	2100024	1	175	1	n	3	1	1	

With higher income, it's more likely for people to choose higher price brand.

Exercise 2

We are interested in the effect of price on demand. Propose a model specification.

To consider the effect of price, we can use Conditional logit model

Interpret the coeffcient on price.

```
[1] -6.6566340 -0.9543259 1.2969965 -1.7173298 -2.9040264 -1.5153021 0.2517927 1.4648942 2.3575437 [10] -3.8966267
```

-6.65 means that if price of brand(2-10) increases, the demand of choosing this product decrease, the demand of choosing alternatives will increase.

 $-0.95 \sim -3.89$ are intercepts.

Exercise 3

We are interested in the e ect of family income on demand

family income varies among individuals are not the alternatives, use Multinomial logit model

Interpret the coe cient on family

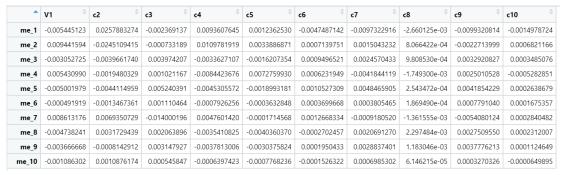
```
[1] -0.003156338 0.014507166 0.003980338 -0.001328126 0.030527384 -0.007002723 0.022807121 0.017661767 [9] 0.010698254 -0.843545649 -2.397656003 -1.199428121 -1.688616844 -4.137055731 -1.529169108 -2.846055103 [17] -2.573291074 -4.279712751
```

For $-0.003 \sim 0.0107$ are beta, for example, -0.003 means that if income increases, the demand of choosing the first choice will decrease.

 $-0.84 \sim -4.279$ are intercepts.

Exercise 4

Model 1



Element in table

For example, in $me_1 - v1$:

-0.00544 means that one unit increase in the price of product 1 will decrease 0.00544 in the probability to buy the product 1

Model2

```
[,1]
[1,] -0.0010504137
[2,] -0.0009016311
[3,] 0.0006266867
[4,] 0.0001660472
[5,] -0.0002794477
[6,] 0.0004431356
[7,] -0.0006821378
[8,] 0.0008861440
[9,] 0.0007338590
[10,] 0.0000577577
```

For example, -0.0010504 means that one unit change increase in family income will decrease 0.0010504 in the probability of choosing first choice compared with other 9 choices

Exercise 5

Beta_f

Beta r

Remove choice 1

```
> beta_r

[1] 2.059202266 0.016721323 0.006614508 0.001215756 0.032891379 -0.003689518 0.025468878 0.020231747

[9] 0.012479752 -1.470467400 -1.261403167 -0.565696438 -2.812995853 -1.139907155 -2.511165831 -2.759864325

[17] -4.705006196
```

MTT

MTT is 7821.209

MTT > the critical value of chi_square, reject the null hypothesis that the two results are the same