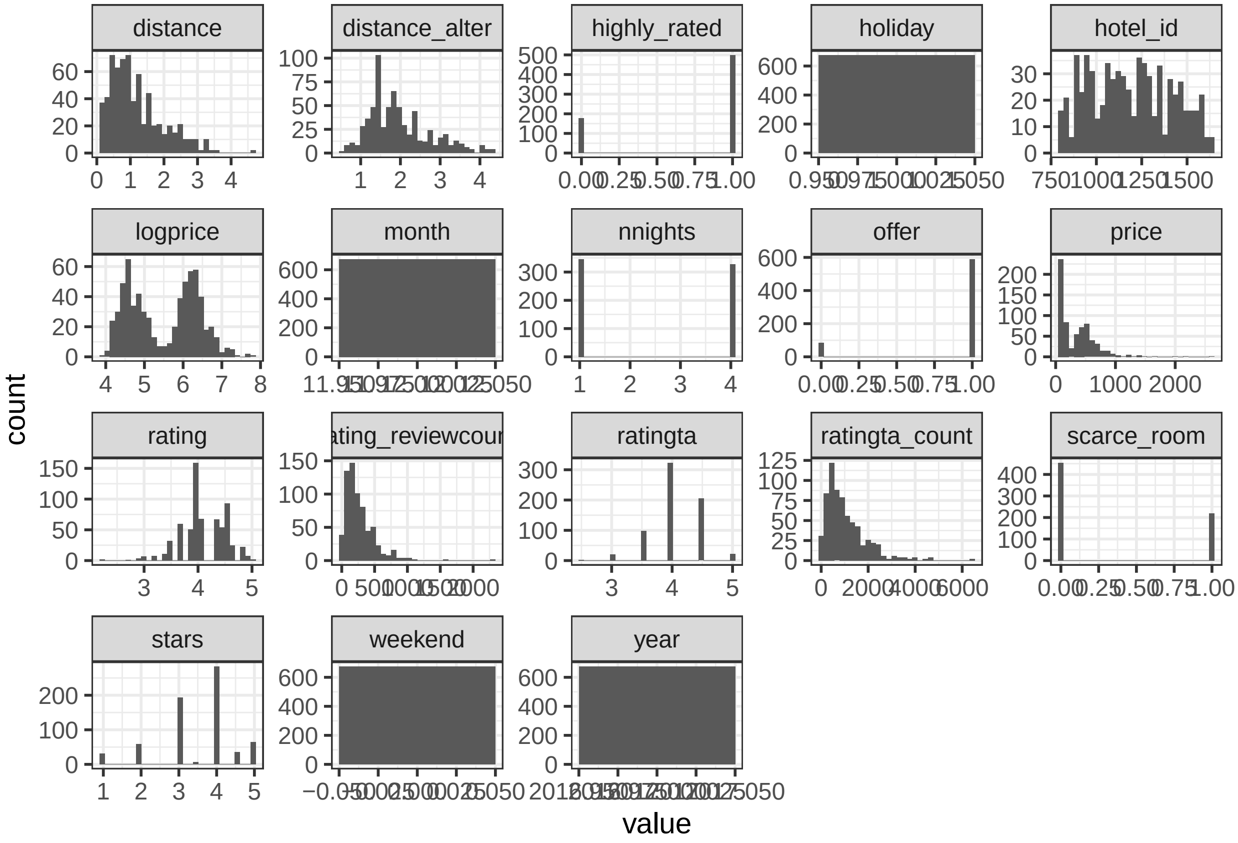
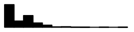
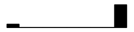
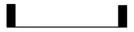
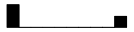
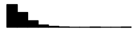
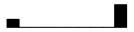
DA2 Assignment 2 Appendix

Distributions, Correlations

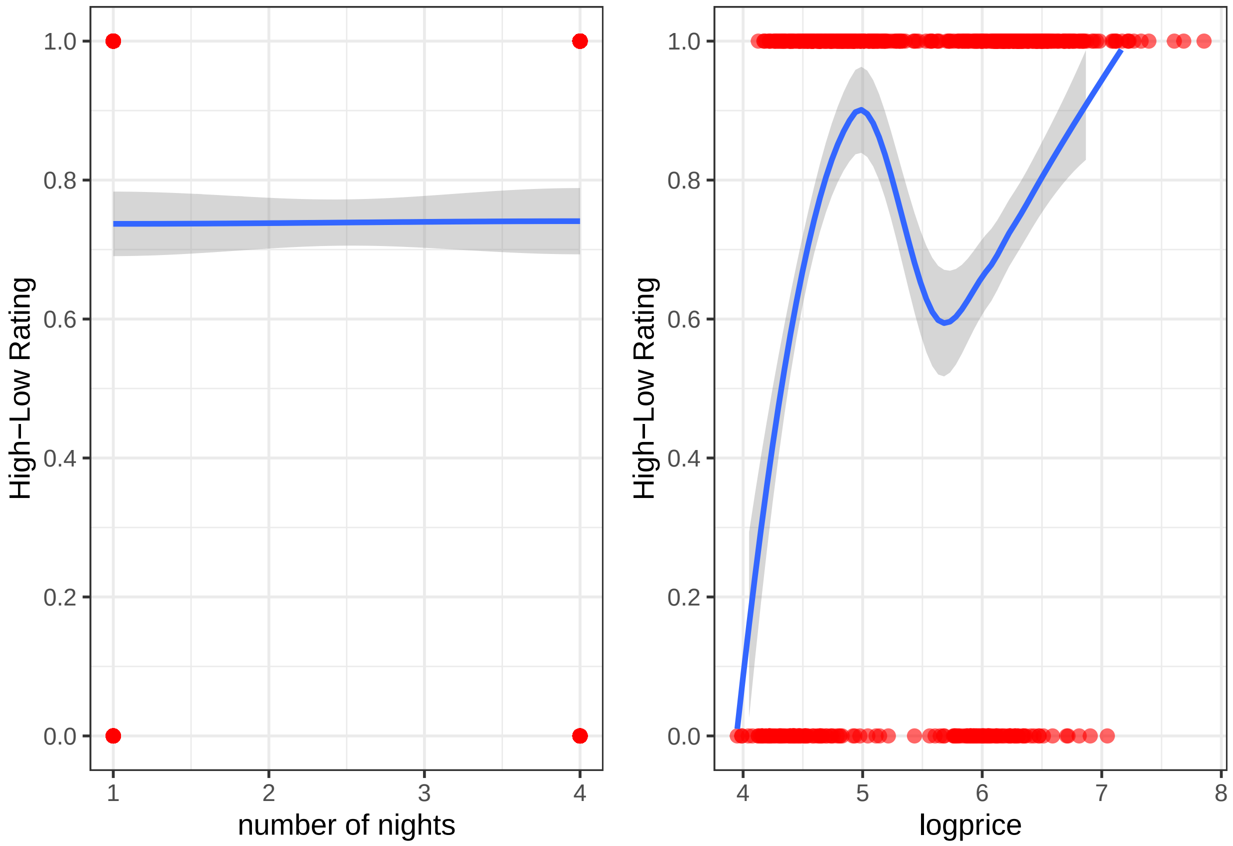


```
##                      Var1          Var2 value
## 1               hotel_id      hotel_id  1.00
## 2                  price      hotel_id -0.07
## 3                  offer      hotel_id -0.02
## 8                nnights      hotel_id -0.01
## 9            scarce_room      hotel_id  0.04
## 10              distance      hotel_id  0.15
## 11                 stars      hotel_id -0.03
## 12                rating      hotel_id -0.04
## 13    rating_reviewcount      hotel_id -0.08
## 14              ratingta      hotel_id -0.02
## 15        ratingta_count      hotel_id -0.13
## 16        distance_alter      hotel_id  0.07
## 17              logprice      hotel_id -0.06
## 18        highly_rated           hotel_id  0.02
## 20               price              price  1.00
## 21               offer              price -0.09
## 26             nnights              price  0.75
## 27         scarce_room              price  0.03
## 28            distance              price -0.10
## 29               stars              price  0.28
## 30              rating              price  0.27
## 31  rating_reviewcount              price  0.01
## 32            ratingta              price  0.27
## 33      ratingta_count              price  0.12
## 34      distance_alter              price -0.08
## 35            logprice              price  0.91
## 36        highly_rated              price  0.16
## 39               offer              offer  1.00
## 44             nnights              offer -0.06
## 45         scarce_room              offer  0.01
## 46            distance              offer  0.02
## 47               stars              offer  0.10
## 48              rating              offer  0.05
## 49  rating_reviewcount              offer  0.09
## 50            ratingta              offer  0.08
## 51      ratingta_count              offer  0.10
## 52      distance_alter              offer  0.00
## 53            logprice              offer -0.08
## 54        highly_rated              offer  0.03
## 58                year               year  1.00
## 77               month              month  1.00
## 96             weekend            weekend  1.00
## 115            holiday            holiday  1.00
## 134            nnights            nnights  1.00
## 135        scarce_room            nnights  0.03
## 136           distance            nnights  0.01
## 137              stars            nnights  0.02
## 138             rating            nnights  0.02
## 139 rating_reviewcount            nnights  0.01
## 140           ratingta            nnights  0.02
## 141     ratingta_count            nnights  0.01
## 142     distance_alter            nnights  0.01
## 143           logprice            nnights  0.89
## 144       highly_rated            nnights  0.00
## 153        scarce_room        scarce_room  1.00
## 154           distance        scarce_room -0.11
## 155              stars        scarce_room -0.19
## 156             rating        scarce_room -0.03
## 157 rating_reviewcount        scarce_room -0.20
## 158           ratingta        scarce_room  0.02
## 159     ratingta_count        scarce_room -0.20
## 160     distance_alter        scarce_room -0.10
## 161           logprice        scarce_room  0.02
## 162       highly_rated        scarce_room -0.10
## 172           distance           distance  1.00
## 173              stars           distance  0.17
## 174             rating           distance -0.03
## 175 rating_reviewcount           distance -0.19
## 176           ratingta           distance -0.04
## 177     ratingta_count           distance -0.04
## 178     distance_alter           distance  0.95
## 179           logprice           distance -0.09
## 180       highly_rated           distance  0.04
## 191              stars              stars  1.00
## 192             rating              stars  0.55
## 193 rating_reviewcount              stars  0.10
## 194           ratingta              stars  0.46
## 195     ratingta_count              stars  0.26
## 196     distance_alter              stars  0.14
## 197           logprice              stars  0.25
## 198       highly_rated              stars  0.43
## 210             rating             rating  1.00
## 211 rating_reviewcount             rating  0.15
## 212           ratingta             rating  0.84
## 213     ratingta_count             rating  0.26
## 214     distance_alter             rating -0.02
## 215           logprice             rating  0.25
## 216       highly_rated             rating  0.73
## 229 rating_reviewcount rating_reviewcount  1.00
## 230           ratingta rating_reviewcount  0.13
## 231     ratingta_count rating_reviewcount  0.57
## 232     distance_alter rating_reviewcount -0.22
## 233           logprice rating_reviewcount  0.03
## 234       highly_rated rating_reviewcount  0.15
## 248           ratingta           ratingta  1.00
## 249     ratingta_count           ratingta  0.25
## 250     distance_alter           ratingta -0.01
## 251           logprice           ratingta  0.25
## 252       highly_rated           ratingta  0.62
## 267     ratingta_count     ratingta_count  1.00
## 268     distance_alter     ratingta_count -0.07
## 269           logprice     ratingta_count  0.12
## 270       highly_rated     ratingta_count  0.23
## 286     distance_alter     distance_alter  1.00
## 287           logprice     distance_alter -0.07
## 288       highly_rated     distance_alter  0.04
## 305           logprice           logprice  1.00
## 306       highly_rated           logprice  0.16
## 324       highly_rated       highly_rated  1.00
```

Notably, we can see that prices have lognormal distribution. They are also easier to interpret in % differences. TripAdvisor rating and custome rating have 0.84 correlation. TripAdvisor ratings hopefully largely come from customer ratings so there is likely a big overlap in the two which is why they explain each others variation.

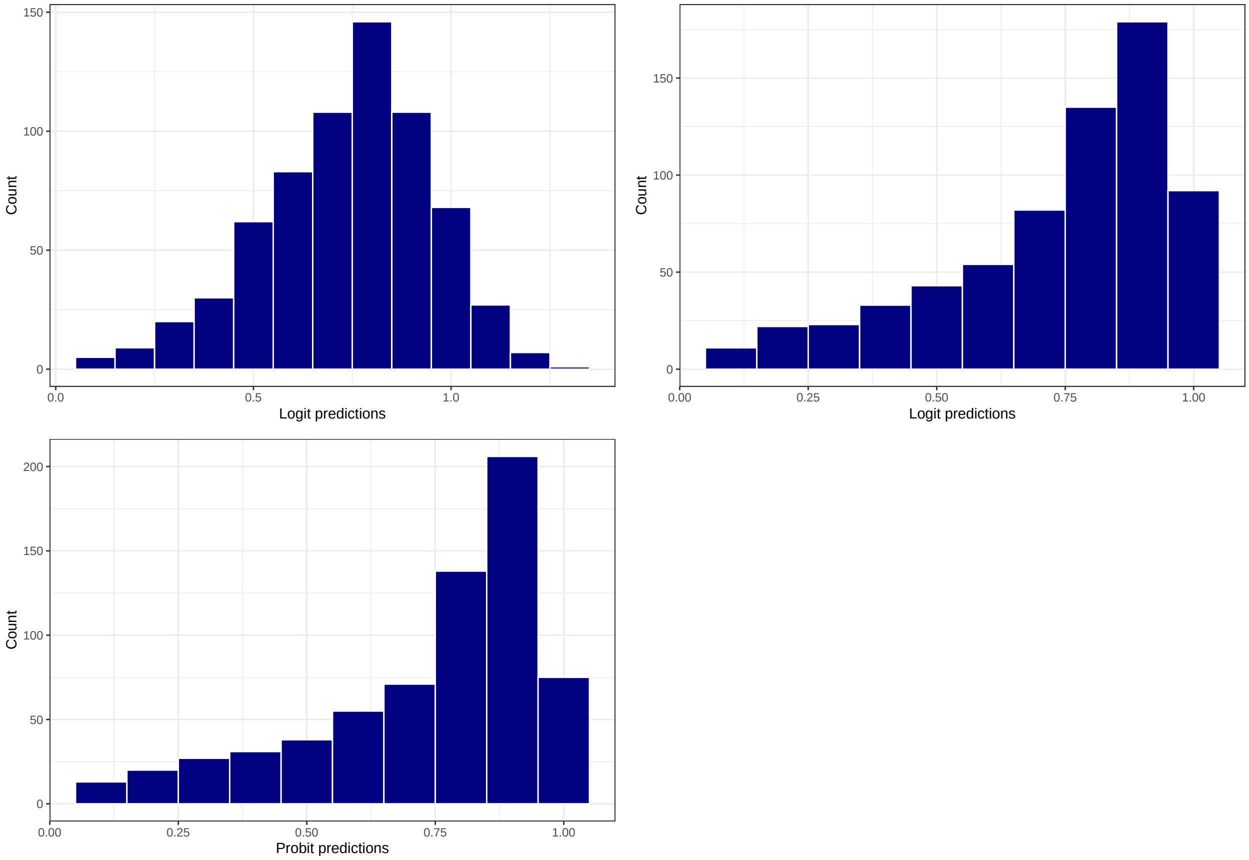
	Unique (#)	Missing (%)	Mean	SD	Min	Median	Max	
hotel_id	349	0	1189.9	223.9	799.0	1182.0	1632.0	
price	380	0	352.2	305.9	52.0	288.0	2580.0	
offer	2	0	0.9	0.3	0.0	1.0	1.0	
year	1	0	2017.0	0.0	2017.0	2017.0	2017.0	
month	1	0	12.0	0.0	12.0	12.0	12.0	
weekend	1	0	0.0	0.0	0.0	0.0	0.0	
holiday	1	0	1.0	0.0	1.0	1.0	1.0	
nnights	2	0	2.5	1.5	1.0	1.0	4.0	
scarce_room	2	0	0.3	0.5	0.0	0.0	1.0	
distance	35	0	1.2	0.8	0.1	1.0	4.6	
stars	8	0	3.5	1.0	1.0	4.0	5.0	
rating	18	0	4.1	0.4	2.2	4.1	5.0	
rating_reviewcount	267	0	273.0	243.2	3.0	208.5	2303.0	
ratingta	6	0	4.1	0.4	2.5	4.0	5.0	
ratingta_count	317	0	1056.3	901.7	13.0	784.0	6441.0	
distance_alter	36	0	2.0	0.8	0.5	1.8	4.3	
logprice	380	0	5.5	0.9	4.0	5.7	7.9	
highly_rated	2	0	0.7	0.4	0.0	1.0	1.0	

Lowess graphs



We can see no association for number of nights spent by customer. For logprices, I decided to add knots at ln price = 5 and ln price = 5.6.

Histogram of 2 nonlinear models' predictions



As intended nonlinear models don't have predictions above 1.