Computational Finance Project 9
Nitish Ramkumar

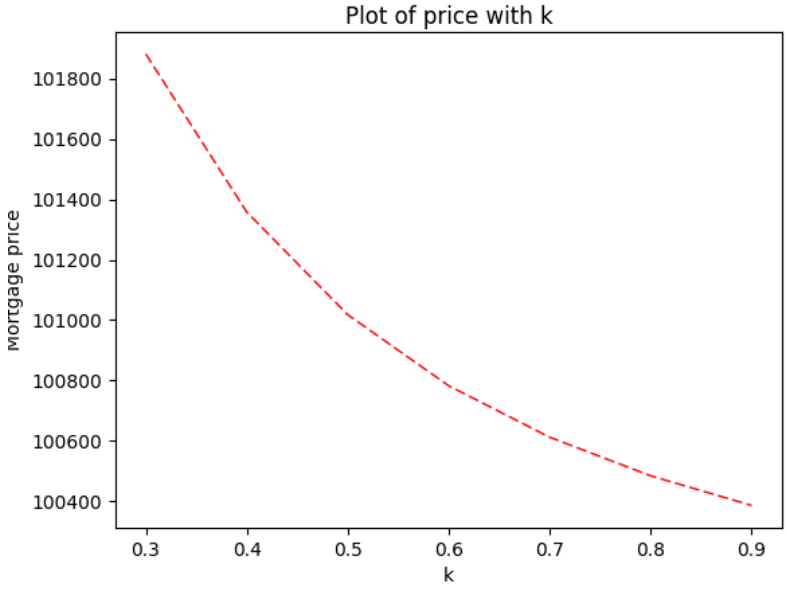
Question 1

1a)

The price of the MBS using the Numerix prepayment model is after simulating using Monte Carlo simulation is **100782.3946**

1b)

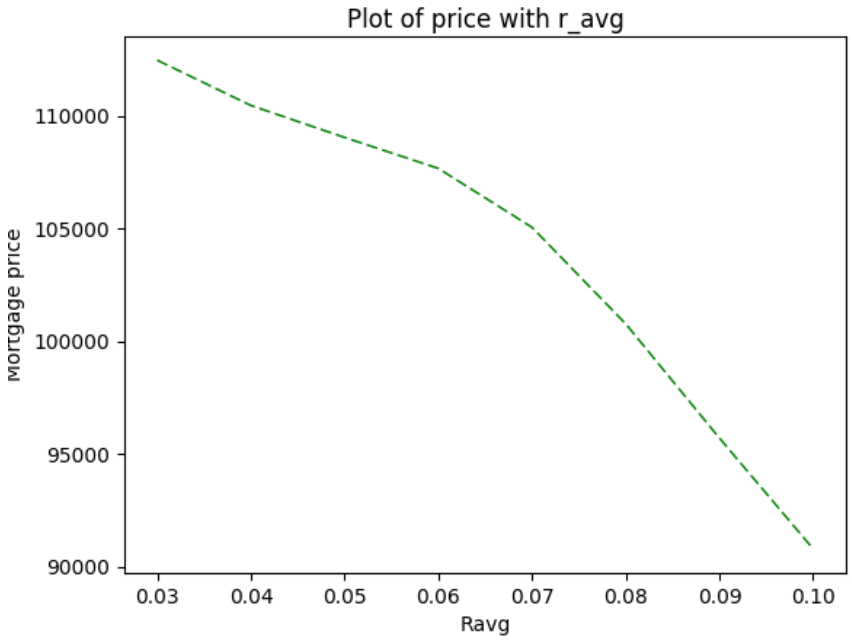
k	Price
0.3	101882.793
0.4	101358.433
0.5	101018.135
0.6	100782.395
0.7	100611.694
0.8	100483.789
0.9	100385.427



Price of the MBS using numerix prepayment method reduces with increase in k

1c)

RAvg	Price
0.03	11247.8642
0.04	11047.0195
0.05	10905.0613
0.06	10767.7852
0.07	10506.3989
0.08	10078.2395
0.09	95714.7266



Price of the MBS using numerix prepayment method reduces with increase in Ravg. The negative convexity can be observed at lower Ravg, which is a feature of the option on the MBS.

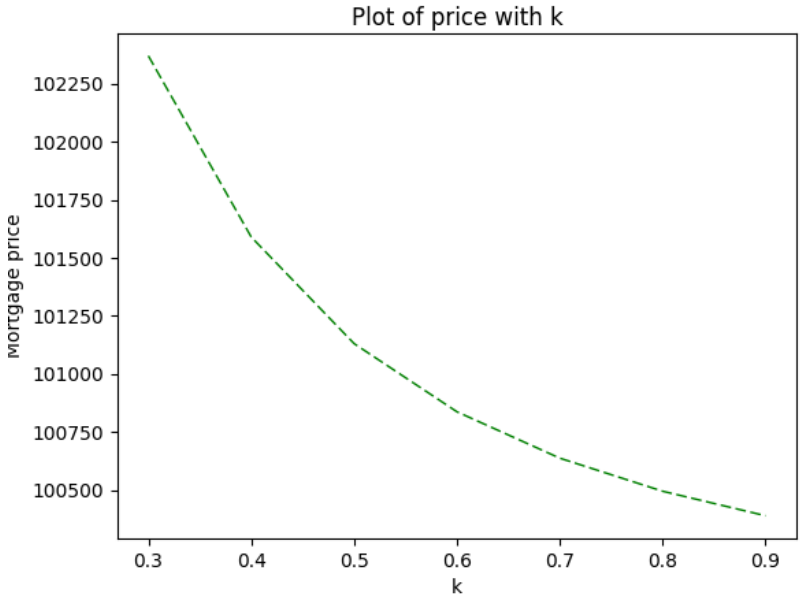
Question 2

2a)

Price of the MBS using the PSA prepayment model after performing Monte Carlo simulations is **100837.9729**

2b)

K	Price
0.3	1.02369594
0.4	1.01590140
0.5	1.01131384
0.6	1.00837973
0.7	1.00638385
0.8	1.00496035
0.9	1.00390632



Price of the MBS using the PSA prepayment model reduces with increase in k.

Question 3

The OAS for the MBS with market value of 110000 is **-0.0133 (-1.33%)**

Question 4

The OAS Duration of the MBS with market value of 110000 is **6.8212**
The OAS Convexity of the MBS with market value of 110000 is **41.7405**

Question 5

The price of the PO and IO tranches for different values of ravg are as follows:
(P.S.: The PO and IO were done on a OAS MBS, to make sure the IO + PO leads to the market value of 110000)

RAvg	**IO**	**PO**
0.03	30458.917965	87937.665246
0.04	31385.150314	85035.548151
0.05	34726.809912	80788.509307
0.06	41398.756307	73837.313386
0.07	49294.519273	64474.261816
0.08	54755.134632	55244.865368
0.09	56341.593026	48350.313697
0.10	55397.309791	43751.094093

The sum of the IO and PO at 0.08 is almost 110000. It was at this point, we calculated the OAS for the MBS.