MFE405 Project 5

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Problem 1.

(a)

	Maturity T	Num terms (k)	Value Laguerre ($)
0	0.5	2	1.75387
1	0.5	3	1.78258
2	0.5	4	1.78425
3	1.0	2	2.20751
4	1.0	3	2.27400
5	1.0	4	2.29354
6	2.0	2	2.66586
7	2.0	3	2.80456
8	2.0	4	2.83551

cc

When K is higher, the option price is also higher. As the maturity increases, the difference due to different k is also larger.

(b)

	Maturity T	Num terms (k)	Value Hermite ($)
0	0.5	2	1.72073
1	0.5	3	1.78013
2	0.5	4	1.79180
3	1.0	2	2.11580
4	1.0	3	2.28920
5	1.0	4	2.29669
6	2.0	2	2.45883
7	2.0	3	2.81467
8	2.0	4	2.84704

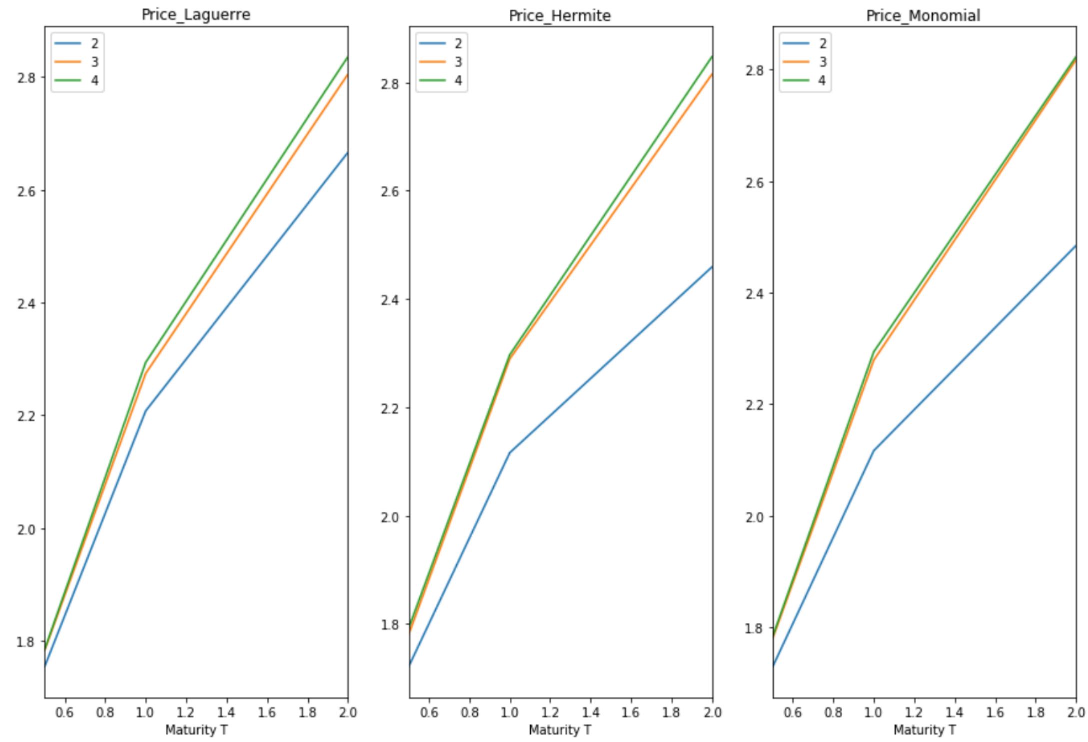
The same situation as the Laguerre method: K is higher, the option price is also higher. However, the discrepancy between prices due to different k has been deepen than Laguerre method.

(c)

	Maturity T	Num terms (k)	Value Monomial ($)
0	0.5	2	1.72888
1	0.5	3	1.77960
2	0.5	4	1.78318
3	1.0	2	2.11647
4	1.0	3	2.27898
5	1.0	4	2.29380
6	2.0	2	2.48435
7	2.0	3	2.81753
8	2.0	4	2.82311

The same situation as the Laguerre method: K is higher, the option price is also higher. The discrepancy between prices due to different k is larger than Laguerre method but smaller than Hermite method.

(d)



On the graph above, from left to right represents different method used in the regression. Theoretically, the number of terms used in the regression should not yield big difference in prices calculated. From the data table and the graph above, the property is evident as varying the number of terms used in the OLS regression does not change the price of option very much. When the time to maturity is 2, and the number of terms used in the regression is also 2, the Laguerre regression yields a slightly higher price than Hermite polynomials and monomials. Laguerre performs better than the other two methods especially when the order k =2. However, when it comes to k=3, all methods do great job and it may be unnecessary to do k=4. Simple Monomials might be superior among the three because its computation is the simplest.