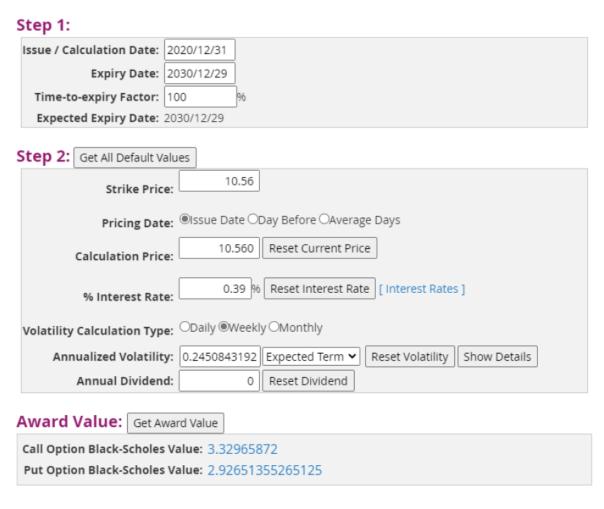
```
import matplotlib.pyplot as plt
import numpy as np

from black_scholes_merton import BSMoption
from drawings import *
%load_ext autoreload
%autoreload 2
```



```
In [3]: # spot, exercise, sigma, time, rate, dividend_rate = None
vars = [10.56, 10.56, .2450843192, 10, .0039, 0]
baseCall = 3.32965872
draw_both_tables(vars, baseCall)
```

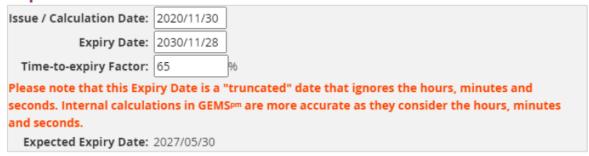
Input Values		
	values	
spot	10.56	
exercise	10.56	
sigma	0.2450843192	
time	10	
rate	0.0039	
dividend_rate	0	
	Jan 22, 2021	

Call and Put Prices

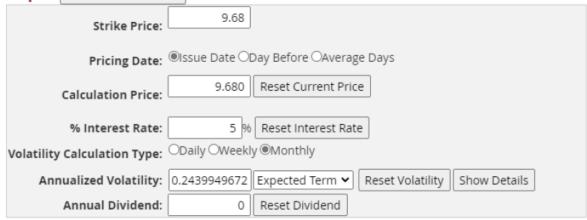
	Value	MRMG Value
Call	3.32966	3.32966
Call Diff (%)		-0.0%

Jan 22, 2021

Step 1:



Step 2: Get All Default Values



Award Value: Get Award Value

```
Call Option Black-Scholes Value: 3.60688165
Put Option Black-Scholes Value: 0.976418882441624
```

```
In [4]: # spot, exercise, sigma, time, rate, dividend_rate = None
    vars = [9.68, 9.68, .2439949672, 6.5, 0.05, 0]
    baseCall = 3.60688165

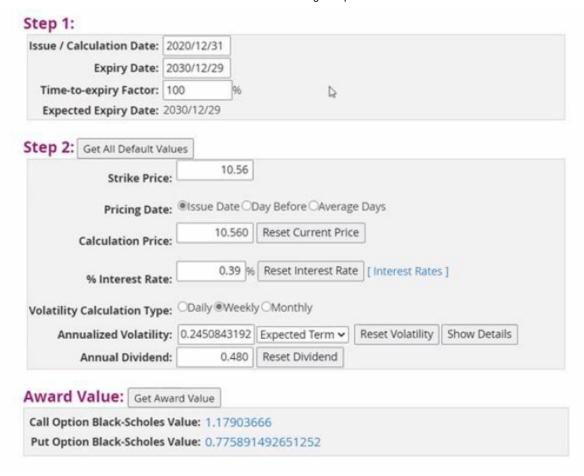
    draw_both_tables(vars, baseCall)
```

Input Values		
	values	
spot	9.68	
exercise	9.68	
sigma	0.2439949672	
time	6.5	
rate	0.05	
dividend_rate	0	
	Jan 22, 2021	

Call and Put Prices

	Value	MRMG Value
Call	3.60688	3.60721
Call Diff (%)		0.01%

Jan 22, 2021

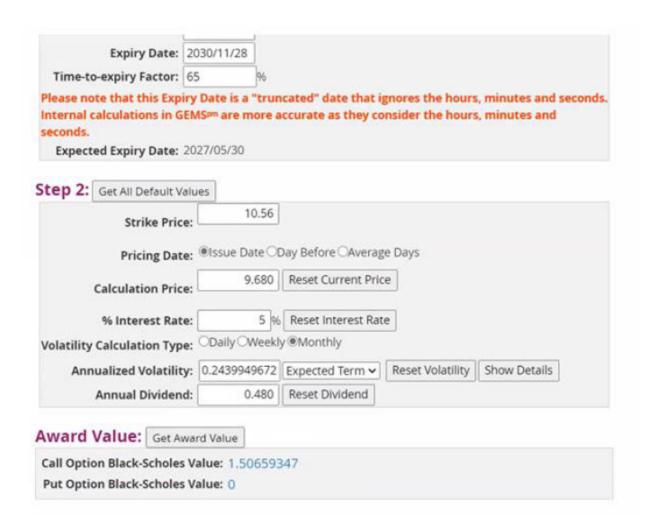


```
In [6]: # spot, exercise, sigma, time, rate, dividend_rate = None
  vars = [10.56, 10.56, .2450843192, 10, .0039, (.48/10.56)]
  baseCall = 1.17903666

  draw_both_tables(vars, baseCall)
```

Input Values		
	values	
spot	10.56	
exercise	10.56	
sigma	0.2450843192	
time	10	
rate	0.0039	
dividend_rate	e 0.045454545454545	
	Jan 22, 2021	

Call and Put Prices		
	Value	MRMG Value
Call	1.17904	1.17915
Call Diff (%)		0.01%
		Jan 22, 2021



```
In [7]: # spot, exercise, sigma, time, rate, dividend_rate = None
```

```
vars = [9.68, 10.56, .2439949672, 6.5, .05, (.48/9.68)]
baseCall = 1.50659347
```

draw_both_tables(vars, baseCall)

Input Values		
	values	
spot	9.68	
exercise	10.56	
sigma	0.2439949672	
time	6.5	
rate	0.05	
dividend_rate	0.049586776859504134	
	Jan 22, 2021	

Call and Put Prices

	Value	MRMG Value
Call	1.50659	1.50672
Call Diff (%)		0.01%

Jan 22, 2021

Please note that this Expiry Date is a "truncated" date that ignores the hours, minutes and seconds. Internal calculations in GEMS^{pm} are more accurate as they consider the hours, minutes and seconds.

Expected Expiry Date: 2027/05/30

Step 2: Get All Default Values

```
Strike Price: 10.56

Pricing Date: Sue Date Day Before Average Days

Calculation Price: 9.680 Reset Current Price

% Interest Rate: 0.34 % Reset Interest Rate [Interest Rates]

Volatility Calculation Type: Daily Weekly Monthly

Annualized Volatility: 0.2640452644 Expected Term Reset Volatility Show Details

Annual Dividend: 0.480 Reset Dividend
```

Award Value: Get Award Value

Call Option Black-Scholes Value: 0.99825754

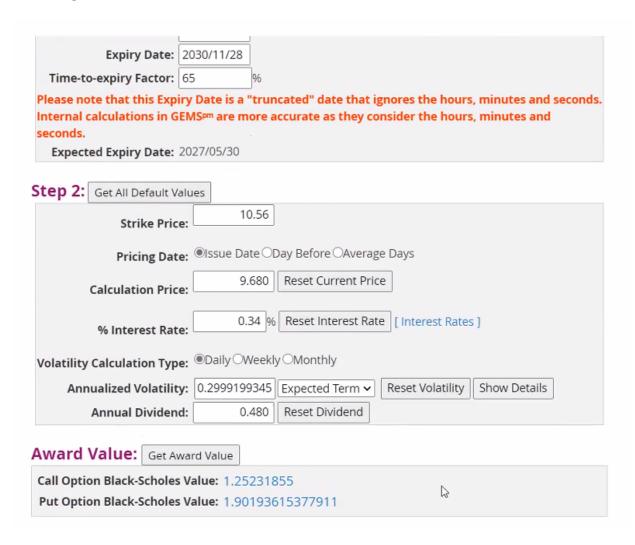
Put Option Black-Scholes Value: 1.64787514377911

In [10]:

```
# spot, exercise, sigma, time, rate, dividend_rate = None
vars = [9.68, 10.56, .2640452644, 6.5, 0.0034, .48/9.68]
baseCall = .99825754
draw_both_tables(vars, baseCall)
```

Input Values		
	values	
spot	9.68	
exercise	10.56	
sigma	0.2640452644	
time	6.5	
rate	0.0034	
dividend_rate	0.049586776859504134	
	Jan 22, 2021	

Call and Put Prices		
	Value	MRMG Value
Call	0.99826	0.99836
Call Diff (%)		0.01%
		Jan 22, 2021



```
In [11]:  # spot, exercise, sigma, time, rate, dividend_rate = None
```

vars = [9.68, 10.56, .2999199345, 6.5, 0.0034, .48/9.68]
baseCall = 1.25231855

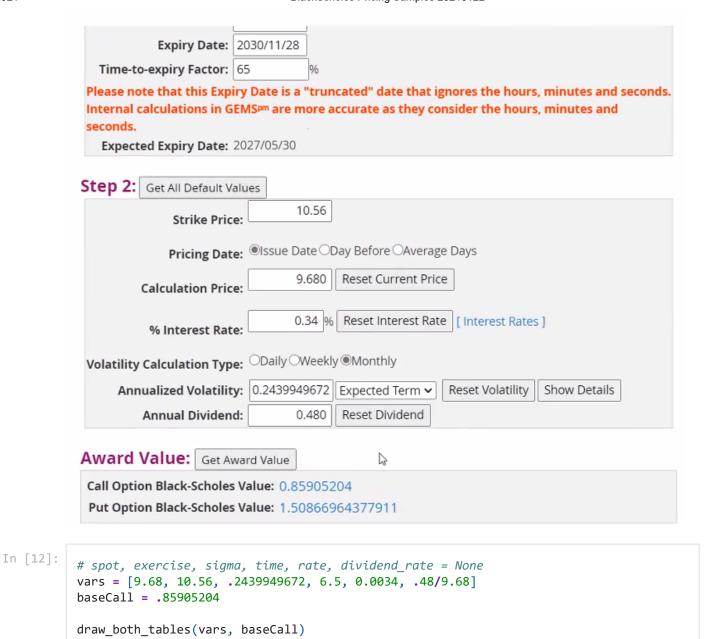
draw_both_tables(vars, baseCall)

Input Values		
	values	
spot	9.68	
exercise	10.56	
sigma	0.2999199345	
time	6.5	
rate	0.0034	
dividend_rate	0.049586776859504134	
	Jan 22, 2021	

Call and Put Prices

	Value	MRMG Value
Call	1.25232	1.25244
Call Diff (%)		0.01%

Jan 22, 2021



Input Values		
	values	
spot	9.68	
exercise	10.56	
sigma	0.2439949672	
time	6.5	
rate	0.0034	
dividend_rate	0.049586776859504134	

Jan 22, 2021

Call and Put Prices

	Value	MRMG Value
Call	0.85905	0.85914
Call Diff (%)		0.01%

Jan 22, 2021

In []: