

# Topic 9

Payoff of Call Option: 
$$\begin{cases} S_T - X & \text{if } S_T > X \\ 0 & \text{if } S_T \leq X \end{cases}$$

Payoff of Put Option: 
$$\begin{cases} 0 & \text{if } S_T \geq X \\ X - S_T & \text{if } S_T < X \end{cases}$$

Put-Call Parity: 
$$C + \frac{X}{(1+r_f)^T} = S_0 + P, \text{ where } C \text{ is call price \& } P \text{ is put price.}$$

Bounds on Call Price: 
$$\begin{cases} C \geq S_0 - PV(X) - PV(D) \\ C \leq S_0 \end{cases}$$

Hedge Ratio: 
$$H = \frac{C^+ - C^-}{S^+ - S^-},$$
  
 where  $C^+$  ( $C^-$ ) is call price for increased (decreased) stock price.

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<p><b>Topic 9</b></p> <p>Payoff of Call Option: <math>\begin{cases} S_T - X &amp; \text{if } S_T &gt; X \\ 0 &amp; \text{if } S_T \leq X \end{cases}</math></p> <p>Payoff of Put Option: <math>\begin{cases} 0 &amp; \text{if } S_T \geq X \\ X - S_T &amp; \text{if } S_T &lt; X \end{cases}</math></p> <p>Put-Call Parity: <math>C + \frac{X}{(1+r_f)^T} = S_0 + P</math>, where <math>C</math> is call price &amp; <math>P</math> is put price.</p> <p>Bounds on Call Price: <math>\begin{cases} C \geq S_0 - PV(X) - PV(D) \\ C \leq S_0 \end{cases}</math></p> <p>Hedge Ratio: <math>H = \frac{C^+ - C^-}{S^+ - S^-}</math>, where <math>C^+</math> (<math>C^-</math>) is call price for increased (decreased) stock price.</p>	<p><b>Topic 23</b></p> <p>Future Value (FV): <math>FV = CV(1+r)^n</math> or <math>FV = CV(1+r)^n</math> (Use the interest rate <math>r</math>)</p> <p>Present Value (PV): <math>PV = \frac{FV}{(1+r)^n}</math> (Use the interest rate <math>r</math>)</p> <p>PV of a Stream of Cash Flows: <math>PV = \sum_{t=1}^n \frac{CF_t}{(1+r)^t}</math> (Use the interest rate <math>r</math>)</p> <p>Effective Annual Rate (EAR): <math>EAR = (1 + \frac{r}{m})^m - 1</math>, where <math>r</math> is the nominal rate &amp; <math>m</math> is the number of compounding periods per year.</p> <p>Annual Effective Rate (AER): <math>AER = (1 + \frac{r}{m})^m - 1</math>, where <math>r</math> is the nominal rate &amp; <math>m</math> is the number of compounding periods per year.</p> <p>Annual Effective Rate (AER): <math>AER = (1 + \frac{r}{m})^m - 1</math>, where <math>r</math> is the nominal rate &amp; <math>m</math> is the number of compounding periods per year.</p>
<p><b>Topic 10</b></p> <p>Case of Cash Flows: <math>C_t = C_1(1+r)^{t-1}</math>, where <math>C_1</math> is the initial payment</p> <p>Case of Cash Flows: <math>C_t = C_1(1+r)^{t-1}</math>, where <math>C_1</math> is the initial payment</p> <p>Case of Cash Flows: <math>C_t = C_1(1+r)^{t-1}</math>, where <math>C_1</math> is the initial payment</p> <p>Case of Cash Flows: <math>C_t = C_1(1+r)^{t-1}</math>, where <math>C_1</math> is the initial payment</p> <p>Case of Cash Flows: <math>C_t = C_1(1+r)^{t-1}</math>, where <math>C_1</math> is the initial payment</p>	<p><b>Topic 24</b></p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p>
<p><b>Topic 15</b></p> <p>Monthly Rate (R): <math>R = \frac{r}{12}</math>, where <math>r</math> is the nominal rate</p> <p>Monthly Rate (R): <math>R = \frac{r}{12}</math>, where <math>r</math> is the nominal rate</p> <p>Monthly Rate (R): <math>R = \frac{r}{12}</math>, where <math>r</math> is the nominal rate</p>	<p><b>Topic 25</b></p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p>
<p><b>Topic 19</b></p> <p>Future Value (FV): <math>FV = PV(1+r)^n</math></p> <p>Future Value (FV): <math>FV = PV(1+r)^n</math></p> <p>Future Value (FV): <math>FV = PV(1+r)^n</math></p>	<p><b>Topic 26</b></p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p> <p>Value of a Share: <math>V = \frac{D_1}{r - g}</math>, where <math>D_1</math> is the dividend at <math>t=1</math>, <math>r</math> is the required rate of return, and <math>g</math> is the growth rate.</p>

**Legend**

C	Call price of option	C <sub>0</sub>	Current price of option
D	Dividend payment	D <sub>1</sub>	Dividend at $t=1$
r <sub>f</sub>	Risk-free rate	r	Required rate of return
X	Strike price	g	Growth rate
S <sub>0</sub>	Current stock price	S <sup>+</sup>	Stock price at $t=1$
S <sub>T</sub>	Stock price at $t=T$	S <sup>-</sup>	Stock price at $t=1$

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