Just unmute if you have questions. I may not see the chat.

$$\begin{pmatrix} 1 & 1 & 1 \\ f_{1,1} & 1 & f_{1,3} \\ f_{2,1} & 1 & f_{2,3} \end{pmatrix} \tilde{f} = \begin{pmatrix} 1 \\ 1+r \\ 1+r \end{pmatrix}$$

$$\begin{pmatrix} \tilde{f}_1 \\ \tilde{f}_2 \\ \tilde{f}_3 \end{pmatrix} = \begin{pmatrix} f_{11}, r f_{12} \cdots \end{pmatrix}$$

$\boxed{Q3}$ $\tilde{P}^{\alpha}$, $\tilde{P}^{\beta}$ are 2 RNM.

$$\tilde{P} = \theta \tilde{P}^{\alpha} + (1-\theta)\tilde{P}^{\beta}$$

~~W~~ Knows $\tilde{E}^{\alpha}_{n}(D_{n+1} S^{i}_{n+1}) = D_n S^{i}_{n} \quad \forall i$

& $\tilde{E}^{\beta}_{n}(D_{n+1} S^{i}_{n+1}) = D_n S^{i}_{n}$

Want $\tilde{E}_{n}(D_{n+1} S^{i}_{n+1}) = D_n S^{i}_{n}$

Q1: Can you write $\tilde{E}X$ in terms of $\tilde{E}^{\alpha}X$ & $\tilde{E}^{\beta}X$

Q2: " " " $\tilde{E}_n X$ " " $\tilde{E}_n^{\alpha}X$ & $\tilde{E}_n^{\beta}X$

Q1: Guess $\tilde{E}X = \theta\,\tilde{E}^{\alpha}X + (1-\theta)\,\tilde{E}^{\beta}X$

$$\theta\,\tilde{E}^{\alpha}X = \theta \sum X(\omega)\,\tilde{p}^{\alpha}(\omega)$$

$$+ \quad (1-\theta)\,\tilde{E}^{\beta}X = (1-\theta)\sum X(\omega)\,\tilde{p}^{\beta}(\omega)$$

$$\theta\,\tilde{E}^{\alpha}X + (1-\theta)\,\tilde{E}^{\beta}X = \tilde{E}X$$

Q1 AFP of European call.

$$V_0 = \underbrace{\tilde{E}}\left(D_N V_N\right)$$

$$\boxed{V_n = \frac{1}{D_n}\tilde{E}_n\left(D_N V_N\right)}$$

① Find the RNM.

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ & & & \\ & \sim\sim & & \end{pmatrix}\begin{pmatrix}\tilde{p}_1 \\ \tilde{p}_2 \\ \tilde{p}_3 \\ \tilde{p}_4\end{pmatrix} = \begin{pmatrix} 1 \\ 1+r \\ 1+r \\ 1+r \end{pmatrix} \rightarrow \text{solve \& find } \tilde{p}_i$$

$\tilde{p}_1$
$\vdots$
$\tilde{p}_4$