3.1 To obtain γ as a function of $\hat{\alpha}$ take logarithm on both sides of the equation immediately following equation (3.14)

$$\begin{aligned}
(1+\hat{\alpha}X_d) &= \left(-\frac{p_u X_u}{p_d X_d}\right)^{-1/\gamma}(1+\hat{\alpha}X_u) \\
\ln(1+\hat{\alpha}X_d) &= -\frac{1}{\gamma}\ln\left(-\frac{p_u X_u}{p_d X_d}\right)+\ln(1+\hat{\alpha}X_u) \\
\gamma &= \frac{\ln\left(-\frac{p_u X_u}{p_d X_d}\right)}{\ln(1+\hat{\alpha}X_u)-\ln(1+\hat{\alpha}X_d)} \\
&= \frac{\ln\frac{0.18}{0.12}}{\ln(1+\frac{0.3}{1.22}0.18)-\ln(1-\frac{0.3}{1.22}0.12)} \\
&= 5.534.
\end{aligned}$$