Lecture2p

Suppose we buy x Bond A, y Bond B, z Bond C (negative value means short that amount of bond). To eliminate any future payments, we have:

$$\begin{aligned} 100x + 5y + 7z &= 0 \\ 105y + 107z &= 0 \\ x &= -\frac{2}{105}z \\ y &= -\frac{107}{105}z \end{aligned}$$

To get an arbitrage opportunity at the initial state, there must be positive cash inflow at initial state, so we have:

$$\begin{aligned} -95.238x - 98.438y - 103.37z &> 0 \\ -95.238 \times (-\frac{2}{105})z - 98.438 \times (-\frac{107}{105})z - 103.37z &> 0 \\ -1.243z &> 0 \\ z &< 0 \end{aligned}$$

z is negative, so we have to short bond C.

The arbitrage strategy is:

Suppose we short 1 bond C and we have to long $\frac{2}{105}$ bond A and $\frac{107}{105}$ bond B, so that there will be no future cash flow. The arbitrage opportunity cash inflow is:

$$\begin{aligned} &- 95.238 \times \frac{2}{105} - 98.438 \times \frac{107}{105} + 103.37 \times 1 \\ &= 1.2429 \end{aligned}$$