STA 4183 – The Theory of Interest

Formulas for Bonds

Bonds	$K = C\left(\frac{1}{1+i}\right)^n$	$g = \frac{Fr}{C}$	$G = \frac{Fr}{i}$
$P = Fra_{\overline{n}\|i} + C\left(\frac{1}{1+i}\right)^n$		$P = C + C(g-i)a_{\overline{n}\|i}$	
$P = G + (C-G)\left(\frac{1}{1+i}\right)^n$		$P = K + \frac{g}{i}(C-K)$	

Bond Amortization Schedule	
$I_t = iB_{t-1}$	$I_t = Ci + Ci(g-i)a_{\overline{n-t+1}\|i}$
$P_t = Fr - I_t$	$P_t = C(g-i)\left(\frac{1}{1+i}\right)^{n-t+1}$
$B_t = B_{t-1} - P_t$	$B_t = C + C(g-i)a_{\overline{n-t}\|i}$

	B^f_{t+k}	Fr_k	B^m_{t+k}
Theoretical	$B_t(1+i)^k$	$Fr\left(\frac{(1+i)^k-1}{i}\right)$	$B_t(1+i)^k - Fr\left(\frac{(1+i)^k-1}{i}\right)$
Practical	$B_t(1+ki)$	kFr	$B_t(1+ki) - kFr$
Semi–theoretical	$B_t(1+i)^k$	kFr	$B_t(1+i)^k - kFr$

Yield rate i
$i \approx \frac{g - \frac{k}{n}}{1 + \left(\frac{n+1}{2n}\right)k}$ where $k = \frac{P-C}{C}$

Yield rate i' Reinvestment rate j
$(1+i')^n = \frac{C}{P} + \frac{Fr}{P}s_{\overline{n}\|j}$