MATH4511 Quantitative Methods for Fixed Income Derivatives
Tutorial 1

Fixed-Income Securities

• Debt markets instruments
Debt securities (bonds)

• LIBOR markets instruments
Equity securities (stocks)
Derivatives (forwards, futures, options and swaps)

Quotes

- Face value 100
- 1/32 ticks
- + means 0.5

Accrued interest (AI)

- Full price P = p (flat price) +AI
- Day Count Conventions (Actual/actual; Actual/360; 30/360)

Discount (discount factors)

Bond information

T2M	Maturity	Coupon(%)	Freq	Price(%)
0.5y	15/11/2001	7.5	2	101.804688
1.0y	15/05/2002	7.5	2	103.404297
1.5y	15/11/2002	11.625	2	110.664063
1.0y	15/05/2002	8	2	103.889900

Ex1. The cash flows of the bonds

Time	15/05/2001	15/11/2001	15/05/2002	15/11/2002
Bond1	101.804688	103.75	0	0
Bond2	103.404297	3.75	103.75	0
Bond3	110.664063	5.8125	5.8125	105.8125
Disc. Factors	1	0.98125	0.96120105	0.9391477

Ex2. The cash flows of the bonds

Time	15/05/2001	15/11/2001	15/05/2002	
Bond2	103.404297	3.75	103.75	0.98121
Bond4	103.889900	4	104	0.9612025
Disc. Factors	1	0.98121	0.9612025	

Replication (Law of one price)

Bond information

T2M	Maturity	Coupon(%)	Freq	Price(%)
0.5y	15/11/2001	7.5	2	101.8047
1y	15/05/2002	7.5	2	103.4043
1.5y	15/11/2002	11.625	2	110.6641
1.5y	15/11/2002	7.5	2	?

Ex: Replication, matching of cash flows

Dates	15/05/2001	15/11/2001	15/05/2002	15/11/2002	Face value
Bond1	101.8046875	103.75	0	0	-1.81084
Bond2	103.4042969	3.75	103.75	0	-1.87875
Bond3	110.6640625	5.8125	5.8125	105.8125	98.0508
Bond4	104.7207651	3.75	3.75	103.75	100
		-1.8108429	-1.87874949	98.0507974	

* Excel command: {=mMULT(MINVERSE(I12:J13),H12:H13}