Homework 1. Quantitative Methods for fixed Income Securities

CHAPTER 1 Bond Prices, Discount Factors, and Arbitrage (Tuckman)

For the following problems, we assume that today is May 15, 2001.

1.1. Write down the cash flow dates and the cash flows of $1,000 face value of the U.S. Treasury 4s of April 30, 2003, issued on April 30, 2001.

1.2 Here is a list of bond transactions on May 15, 2001. For each transaction find out the transaction price.

Bond	*Price*	*Face Amount*
10.75s of 5/15/2003	112-2$^5/_8$	$10,000
4.25s of 11/15/2003	99-14+	$1,000
7.25s of 5/15/2004	107-4	$1,000,000

1.3 Use this list of Treasury bond prices as of May 15, 2001, to derive the discount factors for cash flows to be received in 6 months, 1 year, and 1.5 years.

Bond	*Price*
7.5's of 11/15/2001	101-25$^3/_4$
7.5's of 5/15/2002	103-12$^{15}/_{16}$
11.625's of 11/15/2002	110-21$^1/_4$

1.4 Suppose there exists a Treasury issue with a 7.5% coupon maturing on November 15, 2002. Using the discount factors derived in question 1.3, what would be the price of the 7.5s of November 15, 2002?

1.5 [**Continued from 1.4**] Say that the 7.5s of November 15, 2002, existed and traded at a price of 105 instead of the price derived in question 1.4. How could one earn an arbitrage profit by trading the 7.5s of November 15, 2002, and the three bonds listed in question 1.3? Using the prices listed in question 1.3, how much arbitrage profit is available in this trade?