Australian National University
Research School of Finance, Actuarial Studies and Applied Statistics

STAT2032/6046: Financial Mathematics

Review Questions (Week 7 – Week 9)

WEEK 7

Question 1

Deposits of $1100 are made into an investment fund at year 0 and year 1. The fund balance is $2500 at year 2.

a. Compute annual money-weighted rate of return.
b. Compute the annual time-weighted rate of return given that the fund balance is $1200 at year 1, just before the $1100 investment made at year 1.

WEEKS 8 & 9

Question 2

An investor owns a $2000 par value bond with coupons of 10% pa payable half-yearly. The bond will mature at par at the end of 10 years. The investor decides that a 6-year bond would be preferable. Current nominal yield rates are 5% convertible half-yearly for all durations. The investor uses the proceeds from the sale of the 10% bond to purchase a bond paying *annual* coupons of 6% pa, maturing at par at the end of 6 years. Find the par value of the 6-year bond.

Question 3

An investor buys two 10-year bonds, each having half-yearly coupons and each redeemable at par. For each bond the purchase price produces the same yield rate. One bond has a par value of $600 and a coupon of $50. The other bond has a par value of $1000 and a coupon of $30.

The first bond is purchased at a premium (ie. $P > 600$). The second bond is bought at discount (ie. $P < 1000$). The dollar amount of premium on the first bond is twice as great as the dollar amount of discount on the second bond. Find the nominal annual yield rate convertible semi-annually.

Question 4

A $200 par value 10-year bond has coupons at the annual rate of 6% payable continuously. If the bond is bought to yield rate i, find the price of the bond expressed as a function of δ.

Question 5

A corporation issues bonds with *annual* 7% coupons maturing in five years, which are quoted at a price that yields 5% effective. It is proposed to replace this issue of bonds with an issue of bonds with annual coupons of 6% at the same price. How long must the new issue run so that the bondholders will still realise 5% effective?

Question 6

A $1000 par value 4% bond with half-yearly coupons matures at the end of 10 years. The bond is callable at $1050 at the ends of years 4 through 6, at $1025 at the ends of years 7 through 9, and at $1000 at the end of year 10. Find the maximum price that an investor can pay and still be certain of a yield rate of 5% convertible semi-annually.