

SIMON FRASER UNIVERSITY
Faculty of Business Administration

Assignment #3

BUS 417-D100
Security Analysis

20-2

Academic Honesty: This assignment is individual work. Students are required to follow requirements of S10.01 (see class webpage).

Rules for Submission: Answer to question in Part I to be typed, single spaced, of maximum length 1 page, with 1" margins and type point not less than 12. (This assignment is typed in 12 point.) Both a) and b) parts have to be contained within one single sided page. There is no page constraint for questions in Part II. Violations will be subject to deductions. Assignments are due in class, at the start of the second lecture in week 10. Be sure to answer all parts of each question.

PART I. ESSAY QUESTIONS. 20 pts. -- 10 pts. each for a) and b).

1.a) What is a "classical immunization strategy"? Identify and explain different methods for showing that a high-convexity portfolio will outperform a low-convexity portfolios if the portfolio durations and initial yields are equal. What assumptions are needed for the out-performance of classical immunization to be valid?

b) What is "traditional yield spread analysis" and under what conditions will this approach to comparison of fixed income security values be invalid or unavailable. How does option adjusted spread analysis correct for these "failures" of traditional yield spread analysis in the valuation of bonds with embedded option features? Once the option adjusted spread has been determined, how can the cost of option be calculated? What are some important pitfalls of using option adjusted spread analysis to value mortgage backed securities and other collateralized debt obligations?

PART II: NUMERICAL AND MATHEMATICAL QUESTIONS. 20 points – 10 pts. each.

1. a) Derive the (annualized) Macaulay duration for: a semi-annual zero coupon bond; a semi-annual term annuity; a semi-annual par bond; and, an annual coupon non-par bond. (Hint: Do not use snapshots from files on the class web page.)

b) Using the life annuity price formula with arithmetically declining survival rates and an interest rate of 2.9%, solve for the Macaulay duration of a life annuity for a 65 year old person that cannot live beyond 95 years using a 'discrete' derivative.

2. You have money to invest for 10 years in Australia and are trying to determine whether to buy and hold a 10 year par bond with yield of 1.01% or to purchase a **duration equal** portfolio of 5 year par bond with yield of 0.40% and a 15 year par bond with yield of 1.327%. i) Calculate the (10 year par bond) duration equal weights and the cost of convexity associated with the 5 + 15 year portfolio. ii) Provide an estimate of the market's expectation of the volatility (standard deviation) of interest rates.