

SIMON FRASER UNIVERSITY
Faculty of Business Administration

Assignment #1

BUS 417-D100
Security Analysis

19-2

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 first lecture in week 4. Be sure to answer all parts of each question.

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

1.a) Discuss the early history of life contingency valuation, from Roman times to the 17th century. Be sure to discuss: the role of life contingencies in municipal and state finance; and, the role of religion in determining the method of security contracting. (See class webpage for example answer.)
b) Contrast the solutions to the life annuity valuation problem developed by de Witt, Halley and de Moivre. Be sure to explain: the connection of the pricing formulas to pricing using discounted expected value; relevant assumptions used to obtain the solutions; and, to identify the limitations for each of the solutions.

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

1. Using the US life table from the class webpage, calculate: a) the life expectancy for a female age 90; b) the price of a term annuity using this life expectancy; c) the price of a life annuity for a female age 90 using Halley's method.

2.a) Assuming arithmetically declining survival rates (de Moivre's formula) and an interest rate of 3.9%, solve for the price of a life annuity for a 55 year old person that cannot live beyond 95 years.
b) Assuming a maximum possible life of 95 years, what is the approximate implied interest rate for a 'life income' of \$80,000/yr. priced at \$1.25 million for a person retiring at age 60? Again assuming a maximum possible life of 95 years, what is the approximate implied interest rate for a 'life income' of \$60,000/yr. priced at \$1.55 million for a person retiring at age 60?