

# 國立臺北大學 114 學年度日間學士班轉學生招生考試試題

學制系級：金融與合作經營學系日間學士班 3 年級

科 目：財務管理

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1. (10%) Free financing is available at Kangaroo Autos for a brand-new, \$10,000 vehicle. After making a \$1,000 down payment, you pay \$300 every month for the following thirty months. Despite not providing free financing, Turtle Motors next door will give you \$1,000 off the list price. If the interest rate is 0.83% each month, which business is providing a better offer?
2. (10%) A 6% six-year bond yields 12% and a 10% six-year bond yields 8%. Calculate the six-year spot rate. Assume annual coupon payments.
3. Permian Partners (PP) produces from aging oil fields in west Texas. 2018 output was 1.8 million barrels annually, but for the foreseeable future, production is dropping at a rate of 7% annually. The total cost of administration, shipping, and production is \$25 per barrel. In 2018, the average price of a barrel of oil was \$65.00. Seven million shares of PP are outstanding. There is a 9% cost of capital. PP pays out dividends on all of its net profits. Assume, for simplicity's sake, that the firm will always exist and that the price per barrel will always be \$25. Ignore taxes.
  - (a) (10%) What is the ending 2018 value of one PP share? Assume that oil prices are expected to fall to \$60 per barrel in 2019, \$55 per barrel in 2020, and \$50 per barrel in 2021. After 2021, assume a long-term trend of oil-price increases at 5% per year.
  - (b) (5%) What is PP's EPS/P ratio, and why is it not equal to the 9% cost of capital?
4. (10%) For her estate in Connecticut, Marsha Jones purchased a used Mercedes horse transporter. The price was \$35,000.00. The goal is to reduce the cost of renting a horse transporter. For \$200 per day plus \$1 per mile, Marsha had been hiring a transporter every other week. The majority of the journeys are between 80 and 100 miles long. Joe Laminitis, the driver, often receives a \$40 gratuity from Marsha. She will just need to pay for maintenance and diesel fuel with the new transporter, which costs around \$0.45 per mile. The annual insurance premium for Marsha's transporter is \$1,200. When Marsha's horse Spike is ready to retire in eight years, the transporter will most likely be worth \$15,000 (in real terms). Is the transporter a positive-NPV investment? Assume a nominal discount rate of 9% and a 3% forecasted inflation rate. Marsha's transporter is a personal outlay, not a business or financial investment, so taxes can be ignored.
5. Ten million dollars are invested in long-term business bonds by Percival Hygiene. The annual standard deviation of this bond portfolio is 10%, while the predicted annual rate of return is 9%. Percival's financial advisor, Amanda Reckonwith, suggests that Percival think about purchasing an index fund that closely resembles the Standard & Poor's 500 Index. The index has an expected return of 14%, and its standard deviation is 16%.
  - (a) (10%) Suppose Percival puts all his money in a combination of the index fund and Treasury bills. Can he thereby improve his expected rate of return without changing the risk of his portfolio? The Treasury bill yield is 6%.
  - (b) (5%) Could Percival do even better by investing equal amounts in the corporate bond portfolio and the index fund? The correlation between the bond portfolio and the index fund is +0.1.

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6. You are considering a plan to manufacture and market a brand-new sluffing machine. The most likely outcomes for the project are as follows: (1) Expected sales: 30,000 units per year (2) Unit price: \$50 (3) Variable cost: \$30 (4) Fixed cost: \$300,000.

A \$1 million initial expenditure is needed for the ten-year project, which will be straight-line depreciated throughout the course of the project to zero. The required rate of return is 12%, while the firm's tax rate is 30%. You are aware, nevertheless, that some of these estimations might be inaccurate. Sales may drop by 30% during the course of the project, in which case the unit price would likely only be \$40. The good news is that variable expenses would decrease proportionately to sales, and fixed expenditures may be as low as \$200,000.

(a) (10%) What is project NPV if all variables are as expected?

(b) (5%) What is NPV in the worst-case scenario?

7. At a variable cost of \$32 per ounce, 10,000 ounces of silver may be extracted from a silver mine. Regardless of whether the mine is open or closed, the annual fixed expenses of ownership are \$40,000. Silver may sell for \$48 an ounce in half of the years, while it can only sell for \$24 in the other years. Ignore taxes.

(a) (5%) What is the average cash flow you will receive from the mine if it is always kept in operation and the silver always is sold in the year it is mined?

(b) (10%) Now suppose you can costlessly shut down the mine in years of low silver prices. What happens to the average cash flow from the mine?

8. (10%) Your firm has gained exclusive manufacturing rights for barkelgassers (BGs) in North America as a result of acquiring a significant patent. An immediate capital expenditure of \$25 million will be required to construct production facilities for 200,000 BGs annually. The projected cost of production is \$65 per BG. Until the patent expires in five years, the BG marketing manager is certain that all 200,000 units may be sold for \$100 each (in real terms). After that, the marketing manager is clueless about the selling price. What is the NPV of the BG project? Assume the real cost of capital is 9%. To keep things simple, also make the following assumptions:

- The technology for making BGs will not change. Capital and production costs will stay the same in real terms.
- Competitors know the technology and can enter as soon as the patent expires, that is, they can construct new plants in year 5 and start selling BGs in year 6.
- If your company invests immediately, full production begins after 12 months, that is, in year 1.
- There are no taxes.
- BG production facilities last 12 years. They have no salvage value at the end of their useful life.

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