The Australian National University

Second Semester Examination - November 2000

Financial Economics

Pass Examination

ECON3006

Study Period: 30 Minutes
Time Allowed: Three Hours

Permitted Materials: Calculators and Foreign Language Dictionaries

There are two parts to the exam. Attempt all questions in Part A and 3 questions in Part B.

Part A.

State whether you agree or disagree with each of the following statements and briefly explain why. This part is worth 25 marks, each question is worth 5 marks.

A.1 When higher expected inflation raises the nominal interest rate the reduction in the wealth of currency holders is equal to the additional seigniorage collected by the Reserve Bank of Australia.

A.2 The expected return on debt will always be higher than the expected return on equity when there is a classical corporate tax.

A.3 If the beta coefficient on News Limited shares is twice the beta coefficient on CSR Limited shares then News shares must pay twice the expected return. (Assume the CAPM holds.)

A.4 When a two year Treasury bond has an average annual yield to maturity of 10 percent then the expected rate of return in the second year must be 15 percent if the rate of return on a 12 month Treasury bond in the first year is 5 percent. (Assume there are no taxes.)

A.5 If investors are expecting an 8 percent dividend yield on Westpac shares over the next 12 months when the share price is currently $2.00 they will expect the share price at the end of the period to be $1.60. (Shares with the same risk are expected to pay a 10 percent return over the same period.)

Part B.

*Answer **three** of the following questions. Each question is worth 25 marks.*

B.1 The price-earnings (P-E) ratios for shares traded on the Australian Stock Exchange (ASX) are reported on a regular basis to provide investors with information they can use to determine their security trades.

(i) Explain why these reported ratios differ across traded shares. What information do investors get from them? Should investors buy shares with high P-E ratios? (5 marks)

(ii) Examine the adjustments that investors would make to reported P-E ratios to convert them into "ideal" P-E ratios. Explain what the ideal ratios measure and why they differ across shares. (7 marks)

(iii) Consider reasons why the so called "new technology stocks" have such high reported P-E ratios. Do stocks with more risk have higher or lower P-E ratios than stocks with less risk? (5 marks)

(iv) Explain why measured depreciation allowances differ from economic depreciation allowances. What are the factors that determine economic depreciation? How does expected inflation raise the effective tax on company income through measured depreciation allowances? (8 marks)

B.2 There are a number of ways that changes in expected inflation can impact on capital asset prices. One of these is through wealth effects in the money market when interest is not paid on currency (notes and coins) held by private agents. To answer the following questions the demand for real currency balances (in billions of dollars) is:

$$m_d = 26 - 100i,$$

where i is the nominal rate of interest. (Assume m_d is unaffected by changes in real income.)

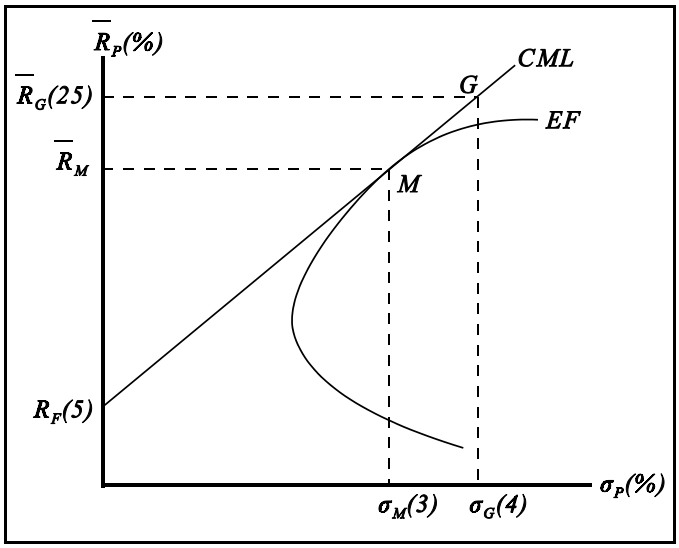
(i) What is the supply of real currency when the equilibrium nominal interest rate is 0.06 (i.e., 6 percent). Calculate how much seigniorage there is when the rate of inflation in the general price level is expected to be 3 percent. Explain how seigniorage transfers revenue to the Reserve Bank of Australia (RBA). Compute a dollar measure of the inefficiency when no interest is paid to currency holders and explain what this inefficiency measures. (Assume the RBA is a monopoly supplier that prints currency at a constant resource cost of 1 percent of the quantity supplied.) (10 marks)

(ii) Now suppose currency holders expect an increase in the rate of inflation over the next year that raises the equilibrium nominal interest rate to 8 percent. Compute the reduction in the demand for real currency balances and calculate a dollar measure (in millions) of the fall in the real wealth of currency holders. Carefully explain why this

loss in wealth occurs and examine circumstances where it is larger for the same change in the nominal interest rate. (10 marks)

(iii) What would the real currency supply be if the RBA paid interest to currency holders? (Assume the RBA incurs no costs of paying interest, and interest is paid to achieve the social optimum i.e., to eliminate any inefficiency in the currency market.) (5 marks)

B.3 In a capital market where the CAPM holds the expected return on a portfolio (G) that combines the risk-free asset (F) and the market portfolio (M) is 25%. (This is based on a risk-free interest rate of 5%, a standard deviation in the return on the market portfolio of 3%, and a standard deviation in the return on portfolio G of 4%. This information is summarised in the diagram.)



(i) What is the expected rate of return on a risky security that has a correlation coefficient with the market portfolio of 0.5 and a standard deviation of 4%? (Show your workings.) Explain why all investors measure and price risk identically when the CAPM holds. (8 marks)

(ii) What is the correlation coefficient between the returns on portfolio G and the market portfolio? Explain your answer. (7 marks)

(iii) Use the CAPM to obtain the market value of a firm with expected net cash flows ($\bar{X}$) of \$25 million that have a covariance with the return on the market portfolio ($\sigma_{X,M}$) of \$0.054 million and a standard deviation (σ_X) of \$10 million. (The firm has a risk-free depreciation rate of minus 3 percent i.e., $d_F = -0.03$.) Explain why the market value of the firm is independent of its debt-equity choice in this setting. (10 marks)

B.4 Anne has an endowment of income ($\bar{M}_0$) in the current period which she allocates to consumption this period (C_0) and next (C_1) to maximise utility $U(C_0,C_1)$. She can borrow and lend as a price taker at the market rate of interest r. (Assume she has standard preferences i.e., strictly convex indifference curves.)

(i) Write out Anne's maximisation problem and illustrate the solution in the (C_0,C_1) consumption space. Measure her wealth (in present value terms) when the government supplements her income with a pension of A_1 dollars in the second

period. Does current consumption have to be inferior for her to save more when the pension is introduced? Identify the gain in utility for Anne from being able to access the capital market. (13 marks)

(ii) Suppose the pension is replaced by an interest rate subsidy which raises Anne's utility by the same amount. Use a diagram to identify the cost of the subsidy, and explain why it differs from the cost of the pension. Explain whether current consumption C_0 is higher or lower under the subsidy than the pension. (12 marks)

The Australian National University

Second Semester Examination - November 2000

Financial Economics

Honours/Graduate Examination

ECON3016 / ECON4001 / ECON8037

Study Period: 30 Minutes
Time Allowed: Three Hours

Permitted Materials: Calculators and Foreign Language Dictionaries

There are two parts to the exam. Attempt all questions in Part A and 3 questions in Part B.

Part A.

State whether you agree or disagree with each of the following statements and briefly explain why. This part is worth 25 marks, each question is worth 5 marks.

A.1 When higher expected inflation raises the nominal interest rate the reduction in the wealth of currency holders is equal to the additional seigniorage collected by the Reserve Bank of Australia.

A.2 The expected return on debt will always be higher than the expected return on equity when there is a classical corporate tax.

A.3 If the beta coefficient on News Limited shares is twice the beta coefficient on CSR Limited shares then News shares must pay twice the expected return. (Assume the CAPM holds.)

A.4 When a two year Treasury bond has an average annual yield to maturity of 10 percent then the expected rate of return in the second year must be 15 percent if the rate of return on a 12 month Treasury bond in the first year is 5 percent. (Assume there are no taxes.)

A.5 If investors are expecting an 8 percent dividend yield on Westpac shares over the next 12 months when the share price is currently $2.00 they will expect the share price at the end of the period to be $1.60. (Shares with the same risk as Westpac shares are expected to pay a 10 percent return over the period.)

Part B.

*Answer **three** of the following questions. Each question is worth 25 marks.*

B.1 The following quotation is taken from an article that summarises the finance literature on corporate leverage decisions:

> *"Auerbach and King (1983) show that the Miller equilibrium requires the existence of certain constraints on investors: without such constraints (on, for example, borrowing and short-selling) questions arise concerning the existence of an equilibrium, for with perfect capital markets realistic tax systems provide opportunities for unlimited arbitrage at government expense between investors and firms in different tax positions. Auerbach and King also show that the combined effect of taxation and risk is to produce a situation in which gearing is relevant. With individual investors facing different tax rates and wishing to hold diversified portfolios the Miller equilibrium can no longer be sustained: investors who on tax grounds alone would hold only equity may nevertheless hold some debt because an equity-only portfolio would be too risky.*"

Critically evaluate this quotation, in particular, assess the proposition that the Miller equilibrium cannot be sustained in the presence of risk when investors have tax preferences for debt and equity. (It is assumed in this quotation that there is common information, a complete set of corporate securities and a frictionless competitive capital market.) Explain why investors will hold only their tax-preferred securities in this setting when the capital market is not "double-complete". Why are short-selling constraints required in the Miller equilibrium? Examine the impact of leverage on firm values when there are no marginal investors. (25 marks)

B.2 There are a number of ways that changes in expected inflation can impact on capital asset prices. One of these is through wealth effects in the money market when interest is not paid on currency (notes and coins) held by private agents. To answer the following questions the demand for real currency balances (in billions of dollars) is:

$$m_d = 26 - 100i,$$

where i is the nominal rate of interest. (Assume m_d is unaffected by changes in real income.)

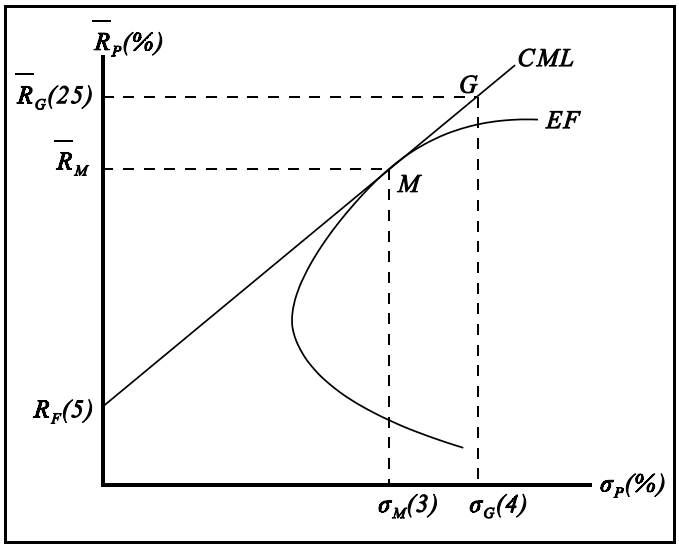
(i) What is the supply of real currency when the equilibrium nominal interest rate is 0.06 (i.e., 6 percent). Calculate how much seigniorage there is when the rate of inflation in the general price level is expected to be 3 percent. Explain how seigniorage transfers revenue to the Reserve Bank of Australia (RBA). Compute a dollar measure of the inefficiency when no interest is paid to currency holders and explain what this inefficiency measures. (Assume the RBA is a monopoly supplier that prints currency at a constant resource cost of 1 percent of the quantity supplied.) (10 marks)

(ii) Now suppose currency holders expect an increase in the rate of inflation over the

next year that raises the equilibrium nominal interest rate to 8 percent. Compute the reduction in the demand for real currency balances and calculate a dollar measure (in millions) of the fall in the real wealth of currency holders. Carefully explain why this loss in wealth occurs and examine circumstances where it is larger for the same change in the nominal interest rate. (10 marks)

(iii) What would the real currency supply be if the RBA paid interest to currency holders? (Assume the RBA incurs no costs of paying interest, and interest is paid to achieve the social optimum i.e., to eliminate any inefficiency in the currency market.) (5 marks)

B.3 In a capital market where the CAPM holds the expected return on a portfolio (G) that combines the risk-free asset (F) and the market portfolio (M) is 25%. (This is based on a risk-free interest rate of 5%, a standard deviation in the return on the market portfolio of 3%, and a standard deviation in the return on portfolio G of 4%. This information is summarised in the diagram.)



(i) What is the expected rate of return on a risky security that has a correlation coefficient with the market portfolio of 0.5 and a standard deviation of 4%? (Show your workings.) Explain why all investors measure and price risk identically when the CAPM holds. (8 marks)

(ii) What is the correlation coefficient between the returns on portfolio G and the market portfolio? Explain your answer. (7 marks)

(iii) Use the CAPM to obtain the market value of a firm with expected net cash flows ($\bar{X}$) of \$25 million that have a covariance with the return on the market portfolio ($\sigma_{X,M}$) of \$0.054 million and a standard deviation (σ_X) of \$10 million. (The firm has a risk-free depreciation rate of minus 3 percent i.e., $d_F = -0.03$.) Explain why the market value of the firm is independent of its debt-equity choice in this setting. (10 marks)

B.4 It is difficult to explain why firms subject to a classical corporate tax pay dividends to their shareholders when personal taxes favour capital gains.

(i) The "trapped" view of dividends by Auerbach (1979) Bradford (1981) and King (1977) (ABK) provides a solution to this puzzle. Use a diagram to illustrate this

solution when **all** shareholders have a constant personal tax rate on capital gains of 30 percent and a personal tax rate on dividends of 50 percent. (Use a two-period **certainty** model and assume **no debt** is issued by corporate firms. The corporate tax rate is 30 percent and shares pay a 10 percent return (after corporate tax).) Identify and critically evaluate the assumptions that ABK make to support their view. Consider the equilibrium outcome when inter-corporate equity is possible. Illustrate the solution in your diagram. What happens when transactions costs raise the cost of paying capital gains on inter-corporate equity by 20 percent? Examine other explanations for the payment of dividends in this tax setting. (18 marks)

(ii) Explain what happens to the market valuation of a firm when it pays a cash dividend to its shareholders. (Assume there is common information and no taxes.) Carefully explain what the Modigliani-Miller dividend policy irrelevance theorem says in the light of your explanation. Consider reasons why this irrelevance theorem fails to apply in practice. (7 marks)