

# FACULTY OF COMMERCE DEPARTMENT OF FINANCE MSc FISCAL STUDIES FINAL EXAMINATIONS OCTOBER 2015 <u>PUBLIC SECTOR RISK MANAGEMENT [CFS 5303]</u> TIME: 3 HOURS

### Instructions to Candidates

- 1. Answer ANY FOUR (4) questions.
- 2. Show ALL calculations for quantitative questions.

#### **Information to Candidates**

- 1. The paper consists of **four (4)** printed pages (including the cover page).
- 2. Questions may be attempted in any order.
- 3. All questions carry equal marks (25 marks).

#### **QUESTION ONE**

Zimbabwe's external public debt is around US\$10bn, which accumulated during the era of the Zimbabwean dollar. The debt is a key issue inhibiting Zimbabwe's ability to access external lines of credit, thus its management is very critical. Suppose you are a consultant and has been engaged to help the Zimbabwean government in drafting a benchmark portfolio to manage external debt. Assuming that the Zimbabwean dollar is the sole legal tender, design a benchmark portfolio for the management of Zimbabwe's external debt, providing plausible justification for all your suggestions. (25 marks)

#### **QUESTION TWO**

(a) A local authority holds a portfolio consisting of stocks and bonds. The expected return on the portfolio's stock portion is 12%, and the standard deviation is 22%. The expected return on the bond portion is 5%, and the standard deviation is 7%. All of these figures are annual. The correlation between the two asset classes is 0.15. The portfolio's market value is \$150 million, with 65% being allocated to stocks. Determine the portfolio's Value-at-Risk (VaR) using the variance-covariance method for the following cases:

i.	A 95% confidence level (CL) yearly VaR	(4 marks)
ii.	A 99% CL yearly VaR	(4 marks)
iii.	A 95% CL weekly VaR	(4 marks)
iv.	A 99% CL weekly VaR	(4 marks)

- (b) An organisation's 1-day 95% confidence level VaR shows a number fairly consistently around \$3 million. A backtest of the calculation shows that, as expected under the calculation, daily portfolio losses in excess of \$3 million tend to occur about once a month. When such losses do occur, however, they typically are more than double the VaR estimate. The portfolio contains a very large short options position. Based on this information:
- i. Is the VaR calculation accurate? (3 marks)
  ii. How can the VaR figure best be interpreted? (3 marks)
  iii. What additional measures might the organisation take to increase the accuracy of its overall exposure assessments? (3 marks)
  Total = 25 marks

#### QUESTION THREE

(a) Liquidity risk for sovereigns stems from both external market conditions and structural problems within their conceptual balance sheets. Evaluate four

measures that sovereigns can use to effectively manage their liquidity risk exposures. (12 marks)

- (b) Explain how interest rate caps and floors can be used by sovereigns in managing their interest rate exposure. (6 marks)
- (c) Balance sheet management for sovereigns entails that assets and liabilities should fall or rise together when responding to movements in interest rates or exchange rates. Discuss three types of asset and liability mismatches that can expose sovereigns to both interest and exchange rate risks. (7 marks) Total = 25 marks

#### **QUESTION FOUR**

- (a) Suggest and support any four operational risk mitigation strategies that can be used by local authorities in Zimbabwe. (16 marks)
- (b) Proper risk management entails first of all the identification of all the risks that an organisation faces, quantifying them and then taking appropriate action to mitigate the risks. However, before any decision on mitigation is taken, one has to consider the organisation's risk appetite. Explain the importance of risk appetite in the risk management process. (5 marks)
- Briefly explain any two approaches to risk identification that can be used by public sector entities in their risk management process. (4 marks)
  Total = 25 marks

#### **QUESTION FIVE**

- (a) A portfolio comprises of 5 bonds whose default correlation is zero. The bonds' one year probabilities of default are 1%, 2%, 5%, 10% and 15%. Calculate the one-year probability of no default in the portfolio. (4 marks)
- (b) A municipality holds a portfolio worth \$10 million. It consists of BBB-rated bonds (\$3 million) and C-rated bonds (\$7 million). The one-year probability of default for BBB-rated bonds is 2% while that for C-rated bonds is 7%. Assume that the bonds are independent and that the recovery rates for BBB-rated and C-rated bonds are 70% and 40% respectively. Calculate the one-year expected credit loss of this portfolio. (4 marks)
- (c) There are ten bonds in a credit default swap basket. The probability of default for each bond is 5%. The probability of each bond defaulting is independent of what happens to the other bonds in the basket. Calculate the probability that exactly one bond defaults. (4 marks)

- (d) Assume that the Zimbabwean government gives a \$500 million loan through CBZ to an established company that is involved in road construction. The company needs the loan for working capital purposes (20%) and to replace its old machinery. Discuss how you will manage the credit risk arising from this transaction. (8 marks)
- (e) In recent years the Zimbabwean government has come up with various loan schemes targeting specific groups in industry and society. One such scheme targeted distressed companies. Discuss how you will manage the default risk arising from this scheme. (5 marks)

# Total = 25 marks

# QUESTION SIX

- (a) Central governments the world over are exposed to huge amounts of contingent liabilities, where beneficiaries are both private and public sector entities. Management of such risks requires that central government follows specific principles in order to contain the risks arising from contingent liabilities granted to the public sector. Analyse any five such principles.(10 marks)
- (b) The growing trend of infrastructure privatisation and other forms of private sector participation such as Build Operate Transfer have accelerated infrastructure developments and operations, and reduced direct government budgetary expenditure on infrastructure projects. However, host governments provide a range of guarantees depending on the characteristics of the project and the nature of country risks. Examine the different risks that governments assume by virtue of providing guarantees in infrastructure projects.

#### (12 marks)

(c) With specific examples, explain the nature of contingent liabilities that central governments face. (3 marks)

Total = 25 marks

## END OF EXAMINATION PAPER