NOVA SCHOOL OF BUSINESS & ECONOMICS

Course: Banking [2206] **Fall Semester 2022**

Exam **December 16, 2022**

Student number: ____________________

Instructions for the exam:

- Start by putting your number on this first page
- You have 2h00 (two) hours to complete the exam
- The exam is worth 20 points
- You should answer all groups in the answer sheets provided
- For Parts II and III, please reply to the questions chosen in a maximum of 15 lines per question
- At the end of the exam, please hand in both this statement and the answer sheets
- You are not allowed to have anything with you except for pen/pencil, drinks/snacks and a non-graphic calculator
- Points can only be provided for material that can be read, understood and interpreted. Consequently, you should try your best to express your ideas clearly and concisely, and to highlight key arguments. Also, please make sure your handwriting is clear and understandable.

Part I [8/20]

In this first part of the exam, you need to select a single answer (identified as a, b, c or d) in each of the 10 questions presented below. You will not be penalized for wrong answers.

1. The Banking Union (BU) - the current banking framework at the EU level - has several distinctive characteristics when compared to the previous framework. Which of the following answers does not correspond to a characteristic of the BU?

a) The ECB directly supervises significant institutions of the participating countries; significant institutions' assets represent less than half of the BU's total assets.
b) At any time, the ECB can decide to directly supervise any one of the "less significant" institutions.
c) The single resolution mechanism (SRM) applies to banks covered by the single supervisory mechanism.
d) Resolution is the orderly restructuring of a bank by a resolution authority when the bank is failing or likely to fail.

2. Which of the following sentences is true?

a) Central banks directly control both inside and outside money.
b) Outside money is that part of the money supply produced by the private banking system.
c) Central banks can influence inside money.
d) Inside money refers to the quantity of notes and coins in the economy.

3. Concerning banks' capital and respective prudential requirements, which of the following sentences is false?

a) Banks are obliged to hold a minimum capital requirement (known as Pillar 1 requirements) and an additional capital requirement (known as the Pillar 2 requirement).
b) Adding to Pillar 1 and Pillar 2 requirements, banks are required to hold buffer requirements.
c) The capital conservation buffer in one of these buffer requirements. It amounts to 4.0% of a bank's total exposures and must be made up of Common Equity Tier 1 capital.
d) According to Pilar 2 guidance, supervisors expect banks to reserve certain amounts of capital for times of stress.

4. From a prudential point of view, banks must fulfill liquidity requirements. Among them, we have the LCR and the NFSR. Which of the following sentences is false?

a) LCR aims to ensure that banks maintain an adequate level of high-quality assets to meet liquidity needs for a 30-day time horizon under an acute stress scenario;
b) NFSR ensures that the bank holds a maximum acceptable amount of stable funding based on the liquidity characteristics of a bank's assets and activities over a 1-year horizon;
c) Both LCR and NFSR must be higher than 100%;
d) The objective of the NFSR is to strengthen the bank's medium to long-term liquidity profile.

5. In making credit decisions, which of the following items is considered a market-specific factor?

a) Whether the reputation of the borrower enhances the credit application.
b) Whether the current debt-equity ratio is sufficiently low to not impact the probability of repayment.
c) Whether the debt can be secured by specific property.
d) Whether the position of the economy in the business cycle phase would affect the probability of borrower default.

6. The risk that an investor will be forced to place earnings from a loan or security into a lower yielding investment is known as:

a) liquidity risk.
b) reinvestment risk.
c) credit risk.
d) foreign exchange risk.

7. Bank XPTO finances a EUR 250 000 5-year fixed-rate loan with a EUR 200 000 1-year fixed-rate deposit. In one month, use the repricing model to determine (i) the bank's repricing (or funding) gap using a 1-year maturity bucket, and (ii) the impact of a 100 basis point (0.01) decrease in interest rates on the bank's annual net interest income? (in EUR)

a) 0; 0.
b) **– 200 000; + 2 000.**
c) – 200 000; - 2 000.
d) 50 000; - 500.

8. Which of the following sentences is false?

a) According to the Bank of International Settlements (BIS), operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.
b) Operational risk is embedded in all (or almost all!) banking products and activities.
c) Credit and market risks are part of the risk-weighted assets (RWAs), but that is not the case for operational risk.
d) Credit, market and operational risks are part of the risk-weighted assets (RWAs).

9. Which of the following sentences is false?

a) Banks define the aggregate level and types of risk they are willing to assume within its risk capacity to achieve its strategic objectives and business plan.
b) In a risk appetite framework, before defining their "risk appetite" banks must do a proper assessment of their "risk universe" and "risk tolerance".
c) The three lines of defense approach is key in risk management and internal controls although it does not consider the front-office as a line of defense.
d) Banking stress testing is widely used, being an important supervisory tool across jurisdictions.

10. In planning for resolution, authorities select the preferred resolution strategy and follow two main approaches: Single Point of Entry (SPE) or Multiple Points of Entry (MPE). Which of the following sentences is false:

a) On the SPE, resolution measures are applied at the level of the parent-undertaking/holding company; on the MPE, resolution measures are applied to more than one resolution entity (parent-undertaking and selected subsidiaries);
b) On the SPE, the resolution process is conducted by the resolution authority of the parent-undertaking; on the MPE, the resolution process is conducted by two or more resolution authorities;
c) On the SPE, the losses are absorbed by each resolution entity; on the MPE, the losses of the subsidiaries are transferred to the parent-undertaking
d) The choice by authorithies of a SPE or MPE strategy is a key element when planning for resolution.

Part II **[10/20]**

In this second part of the exam, you must answer five questions out of the seven presented below. You are free to choose the five that you want to answer to. Each question is worth 1/5 of the 10 points assigned to this group. If you reply to more than five questions, only the first five answered will be considered for grading purposes. Please answer the questions chosen in a maximum of 15 lines per question.

1. Please elaborate on the (four) main credit risk drivers, while also including the sign (minus or plus) of their impact on the credit risk of a given exposure. In this framework, explain the concept of expected and unexpected losses and how they are typically covered by banks (provisions/capital). In your answer, please refer to the VaR approach used for the assessment of the capital requirements under Pilar 1 and the implications in terms of non-covered losses.

[60%] The 4 credit risk main drivers are PD (the probability that the debtor fails his obligations), Loss Given Default (percent of the exposure that the bank may lose in case the borrower defaults), Exposure at default (estimate of the amount outstanding in case the borrower defaults), and maturity (estimation of the maturity of the exposure). These all impact positively the credit risk of a given exposure: a higher PD, LGD, EAD or M implies a higher credit risk.

[20%] The expected loss, given by EL = PD x LGD x EAD, is supposed to be covered by provisions, thus impacting the P&L immediately. The unexpected loss, given by UL = EAD x f (PD, LGD, M), is expected to be covered by the own funds' requirements.

[20%] According to Basel, losses are assessed with a VaR methodology at 99.9%, meaning that credit losses occurring with a 0.1% probability are not considered in the Pilar 1 requirements.

2. Please refer to sources of operational risk and elaborate on the importance of its proper awareness and management. Please also refer to the limitations of the current regulatory approach and to the revised framework proposed by the Basel Committee.

[30%] Operational risk was firstly addressed at the technological level considering the risk of hackers endangering business. One of the main operational risks is cybersecurity, another is internal and external fraud. [other risks could be named, not necessarily these].

[30%] Basel II introduced the importance provided to raising awareness and managing operational risk**.** This is seen as a key feature of Basel II (beyond capital requirements as means to address increasing risks with multiple sources).

As with other risks, it cannot be eliminated but it can be managed. Risk matrices provide a map of risks in terms of severity and frequency. Daily, banks must adopt a data repository and establish a workflow to deal with each occurrence.

[20%] Basel II introduced three methods to calculate minimum capital requirements for operational risk (BIA, Standardized and AMA), of increased complexity and sophistication. AMA was the only risk-sensitive approach but had the difficulty of modelling extreme events (due to the absence of data for rare events).

[20%] Basel presented a unique approach through the calculation of the product between BIC (progressive measure of income that increases with a bank's size) and the ILM (risk-sensitive component capturing a bank's internal operational losses). According to Basel, the ILM serves as a scaling factor that adjusts the baseline capital requirement depending on the operational loss experience of the bank.

3. Please elaborate on the relevance of the stress test as a key part of the bank regulation toolkit distinguishing between macroprudential and microprudential exercises and between the top-down and bottom-up approaches. In addition, identify the stress test exercises that are currently conducted at the Euro Area level.

[20%] Bank stress tests measure the resilience of banks to hypothetical adverse scenarios (e.g., severe recessions) and are used by central banks and regulators to measure risks and manage them through the setting of prudential policy.

[30%] Macroprudential approach: assesses the system-wide resilience to financial and economic shocks and interactions between individual banks. Microprudential approach: assesses the resilience of an individual bank to macroeconomic and financial vulnerabilities and respective shocks.

[30%] Top-down: a stress test performed by a public authority using its framework. Either bank-level or aggregated data may be used, but always in models with consistent methodology and assumptions. Bottom-up: a stress test performed by a bank using its own framework as part of a system-wide exercise, or as part of a stress test where authorities provide banks with common scenario(s) and assumptions.

[20%] The most well-known stress test is the EU-wide stress tests led by EBA, complemented by the ECB's stress test under the SREP. Recently, there was the 2022 climate stress test that is the ECB Banking Supervisory bi-annual thematic stress test.

4. The Basel II framework operates under three pillars (Capital adequacy requirements, supervisory review and market discipline) that have been strengthened by the Basel III accord. Please elaborate.

[25%] Capital adequacy requirements: banks are obliged to maintain certain ratios of capital to their risk-weighted assets. Besides credit risk and the amended market risk, also operational risk needs capital coverage.

[25%] The supervisory review process intends to ensure that banks develop and use better risk management techniques in monitoring and managing these risks. Banks are responsible to keep the adequate capital to their risks, even if above minimum; furthermore, an inadequate risk management cannot be overcome by more capital.

[25%] Market discipline: effective use of disclosure as a lever to strengthen market discipline and encourage sound banking practices through the definition of the information set to disclose to investors. It is not audited, but supervisors have authority regarding it.

[25%] Basel III revises, strengthens and extends the three pillars through: stricter requirements for the quality/quantity of regulatory capital; the capital conservation buffer; a countercyclical capital buffer; a leverage ratio; the LCR and NSFR; additional requirements for systemically important banks).

5. What are the current main challenges of the banking system? Please elaborate.

Open discussion that should include digital, climate transition and cybersecurity.

6. When making strategic decisions banks assess the economic value of a client (or of types of clients). Consider the following information regarding Client X and its relation with Bank Y:

- Deposit: 1000 euros, earning a 2% interest rate
- 20 euros/month of fees and commissions charged to the client
- Loan: 8000 euros, paying a 4% interest rate
- The client has a 2% probability of default on its loan, in which case the bank may lose 40% of the loan amount
- Operating costs for the bank: 80 euros/year
- Legal requirements: 1% of cash reserves (over deposits) and 8% of equity (over assets)
- The cost of capital is 6%. Liquidity is available at the bid/ask of 2%/3%.

Does this client add economic value to the bank? Please quantify. Is the comparison of interest rates (paid/received) sufficient to reach a conclusion?

Costs:

[10%] Interest: 20

[10%] Cost of capital: 8000*8%*6%=38,4

[10%] Cost of other funding: 8000*92%*3%=220,8

[10%] Cost no-repayment (expected loss) =8000*2%*40%= 64

[10%] Operating costs: 80

Income:

[10%] Fees and commissions: 240

[10%] Interest: 320 *(1-0.8%)=320*99,2 = 317.44

[10%] From the deposit=1000*99%*2%=19.8

[10%] The client has a positive economic of 154,04 (577,24-423,2).

[10%] No, the comparison is not sufficient. We may have a loan rate higher that the financing rate or a deposit rate lower than the investment rate and a negative economic value for the client.

7. Please present and elaborate on the (four) resolution measures that are at the disposal of the resolution authority to appropriately address a credit institution's weaknesses considering the circumstances of that credit institution.

[25%] Sale of business: allows for the sale, total or partial, of the credit institution under resolution (or its business) to a private purchaser.

[25%] Asset separation: allows for the transfer of assets to an asset management vehicle with the objective of maximizing their value (used in combination with another resolution measure).

[25%] Bridge institution: the activity of the institution (or the institution itself) is transferred, in whole or in part, to an entity incorporated for this purpose.

[25%] Bail-in: shareholders and creditors are written down and converted, in order for the institution to be recapitalized to the extent necessary to restore its ability to comply with the conditions for authorization, continue to carry out its activities and sustain sufficient market confidence.

Part III [2/20]

In this third part of the exam, you must answer one question out of the five presented below. You are free to choose to the one you prefer to answer to, being that respective to the case you delivered a report on, or not. If you reply to more than one question, only the first one answered will be considered for grading purposes. Please answer the questions chosen in a maximum of 15 lines per question. **[....]**