NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER 2 EXAMINATION 2016-2017

BC3402: Financial Service Processes and Analytics

April/ May 2017   Time Allowed: 2 hours

INSTRUCTIONS

1   This paper contains **THREE (3)** questions and comprises **SIX (6)** pages.

2   Answer all **THREE (3)** questions

3   This is an **open-book** examination.

4   The number of marks allocated is shown at the end of each question.

5   Begin your answer to each question on a separate page of the answer book.

6   Answers will be graded for content and appropriate presentation.

Question 1

Read the following article and answer the questions below.

How do you solve a problem like RTGS moral hazard? – Financial Times Dec 2016

The Bank of England (BoE) release its new consultation paper on Friday titled "A new RTGS service for the United Kingdom: safeguarding stability, enabling innovation." The BoE finally seems to be acknowledging that its real-time gross clearing system (RTGS) is far from perfect and does need overhauling.

As we've written before, RTGS systems were introduced in the 1990s with the aim of radically reducing settlement risk in the banking system with the power of digital technology. The idea was to achieve gross settlement finality for payments, continuously throughout the day and in so doing end the problem of netting risk, also known as Herstatt risk. As the 2008 crisis proved, however, this was not to be.

To the contrary, by creating the perception that payments could be settled instantly real-time without any liquidity constraint, they inadvertently ended up transferring risk to the collateral markets, which over time came to represent the true liquidity limitation of the system. As the Bank noted in 1996 about the system's dependency on collateral:

Note: Question 1 continue on page 2

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Question 1 (continued)

"RTGS systems make final funds in the relevant currencies available to the clearing houses which, in addition, have to use various forms of collateral to cover the time-gaps in the settlement process. RTGS systems therefore speed the process, reduce the periods of exposure, and provide certainty about the precise timing of payment transfers. Banks nevertheless succumbed to the conventional wisdom that RTGS had solved the problem of liquidity risk, which led them to believe if they had enough acceptable collateral they would never again be confronted with an unexpected liquidity shortfall. Nobody, however, noted that an RTGS system might expose the system to an altogether new risk: the breakdown of self-regulating behaviours."

Think of it this way. If you're part of a system that pools risk in such a way that the repercussions of bad behaviour can be arbitrarily annihilate anyone in the group at any time (Russian Roulette style), the group's overall incentive is to act prudently and cohesively, and to restrict access to anyone but trusted and reputable members. This is all the more the case if every now and then an institution is allowed to collapse as a reminder that bad behaviour can reap consequences on anyone in the group, including yourself.

If, however, you're part of a system which transfers risk to "collateral" without any arbitrary repercussions for individual members, the incentive to act imprudently or to let standards drop as a whole is increased. If the system goes down, everyone goes down with it, reducing personal accountability across the whole spectrum. It's a safety amongst numbers effect for bad actors. That's bad because when the system realises that nobody within it can be trusted, it has no choice but to shut down or become self-preserving (especially with respects to the collateral on hand).

Required

a) Based on conventional understanding, how do RTGS minimize settlement risks compared to other forms of wholesale funds settlement systems?

(15 marks)

b) Do you agree with the article's position that RTGS creates a moral hazard for settlement? Provide reasons to support your position.

(15 marks)

(TOTAL: 30 marks)

Question 2

In May 2016, New York Stock Exchange (NYSE) launched its new integrated trading technology platform, NYSE Pillar. The new platform enables NYSE participants to connect to all of its equities and options markets using a single specification.

"Pillar has been designed to reduce complexity, while enhancing consistency, performance and resiliency," states NYSE.

Once completely rolled put, Pillar will enable traders to connect to each of NYSE markets – NYSE, NYSE MKT, NYSE Arca, NYSE Arca Options, NYSE Amex Options, Global OTC and NYSE Bonds – using a single specification and will include new gateways and matching engines.

NYSE highlights the benefits of the new platform such as more efficient processing, shorter time to market for ongoing enhancements and simplified, harmonised order types, terminology and messaging across all of NYSE markets.

Required

a) What do you think are some reasons that prompt NYSE to upgrade their trading system?

(15 marks)

On March 08, 2017, SGX launched a public consultation on bringing back a lunch break for traders. The proposed lunch break will take place from 12pm to 1pm. SGX in 2011 scrapped the mid-day break – which was then from 12.30pm to 2pm – saying it could boost trading by as much as 10 per cent. "Market feedback indicates that while the benefits of continuous all-day trading remain relevant, market participants prefer shorter trading hours," SGX said in a news release.

Required

b) Based on your understanding of the operations of an order-driven market, how will a lunch break be implemented?

(15 marks)

(TOTAL: 30 marks)

Question 3

Jane works for a hedge fund and on the evening of 28th Feb 2017 decided to rebalance a particular portfolio by buying 47,000 units of ABS International shares. The following day, she got the go ahead from the management and instructed her broker Jim at 12 pm to execute the trade in the Singapore Exchange (SGX). Jim's brokerage firm charges $0.05 per share traded, inclusive of the execution fees and clearing fees levied by SGX and CDP.

Jim executed the orders in the following manner:

Time of Day	Historical trading volume of SGX for that time period (15 min block)	Average price in SGX for the time period (15 min block)	No. of shares algorithm bought
12:00 pm	100,000	$12.40	10,000 (market order placed at 12:00pm)
12:15 pm	90,000	$12.60	9,000 (market order placed at 12:15pm)
12:30 pm	90,000	$12.60	9,000 (market order placed at 12:30pm)
12:45 pm	90,000	$12.50	9,000 (market order placed at 12:45pm)
01:00 pm	100,000	$12.60	10,000 (market order placed at 1:00pm)

The order books for the exchange 50 nanoseconds *before* Jim places his market orders are shown below. SGX is able to execute all trades under 80 nanoseconds and there were no hidden or iceberg orders in the order book at the time Jim executed his trades.

1 March 2017 (12:00pm)				1 March 2017 (12:15pm)			
BUY		SELL		BUY		SELL	
Quantity	Price	Price	Quantity	Quantity	Price	Price	Quantity
		12.90	35,000			13.10	60,000
		12.80	10,000			12.90	20,000
		12.70	10,000			12.80	5,000
		12.60	5,000			12.70	5,000
20,000	12.50			20,000	12.60		
10,000	12.40			10,000	12.50		
20,000	12.30			20,000	12.40		
5,000	12.20			20,000	12.30		

Question 3 (continued)

1 March 2017 (12:30pm)			
BUY		SELL	
Quantity	Price	Price	Quantity
		13.00	60,000
		12.90	5,000
		12.80	5,000
		12.70	1,000
20,000	12.60		
10,000	12.50		
20,000	12.40		
10,000	12.30		

1 March 2017 (12:45pm)			
BUY		SELL	
Quantity	Price	Price	Quantity
		13.20	40,000
		13.10	3,000
		12.90	1,000
		12.80	1,000
10,000	12.70		
10,000	12.60		
10,000	12.50		
10,000	12.40		

1 March 2017 (1:00pm)			
BUY		SELL	
Quantity	Price	Price	Quantity
		13.10	25,000
		13.00	3,000
		12.90	1,000
		12.80	1,000
20,000	12.70		
10,000	12.60		
5,000	12.60		
5,000	12.50		

1 March 2017 (1:15pm)			
BUY		SELL	
Quantity	Price	Price	Quantity
		13.00	10,000
		12.90	20,000
		12.80	10,000
		12.70	20,000
20,000	12.60		
20,000	12.50		
20,000	12.40		
10,000	12.30		

Below are some additional information and key prices of ABS International at various points.

Key Prices of ABS International in 2017

28 Feb opening*: $12.10	1 Mar opening*: $12.50
28 Feb closing*: $12.30	1 Mar closing*: $12.60
28 Feb high: $13.40	1 Mar high: $13.50
28 Feb low: $12.00	1 Mar low: $12.10

Note: * Prices quoted are mid-prices

- Singapore exchange operates from 9:00am to 5:00pm without any lunch break
- All currencies here are quoted in Singapore dollar (SGD)
- VWAP for the day is $12.60

Question 3 (continued)

a) What trading algorithm did Jim use in the execution of the trade?

(5 marks)

b) Compute the implementation shortfall for the strategy of the algorithm.

(15 marks)

c) Jane is not happy with the algorithm's performance. Suggest two major modifications you will use to improve this execution strategy and provide details of the modifications. For each modification, justify why it will work better than the existing algorithm in light of the trade details provided in this question.

(20 marks)

(TOTAL: 40 marks)

- END OF PAPER -

BC3402 FINANCIAL SERVICE PROCESSES AND ANALYTICS

Please read the following instructions carefully:

1. **Please do not turn over the question paper until you are told to do so. Disciplinary action may be taken against you if you do so.**

2. You are not allowed to leave the examination hall unless accompanied by an invigilator. You may raise your hand if you need to communicate with the invigilator.

3. Please write your Matriculation Number on the front of the answer book.

4. Please indicate clearly in the answer book (at the appropriate place) if you are continuing the answer to a question elsewhere in the book.