THE OHIO STATE UNIVERSITY
FISHER COLLEGE OF BUSINESS

BUSFIN 4227/7224 Trading & Markets

Sem: Fall Term 2, 2022 **Class Day/Time:** Mo/We 9:35-10:55 **Room:** SB 219
Mo/We 11:10-12:30 SB 219
Mo/We 3:20-4:40 SB 219

Instructor: Professor Ingrid M. Werner **E-mail:** werner.47@ osu.edu
Office Hours: By Appointment via Zoom **Office:** Fisher Hall 818

Course Outline:
In this course, we describe how today's financial markets work; how governments and exchanges regulate them; and how traders create liquidity, volatility, informative prices, trading profits, and transaction costs. The course provides an overview of today's fragmented market for financial securities. We study different market structures: single price auctions, open outcry auctions, screen-based markets, and brokered markets. We study the role of different market participants: investors, brokers, dealers, arbitrageurs, retail traders, buy-side traders (institutions), day traders, and rogue traders. We also study different order types: limit orders, market orders, and stop orders; and trading strategies: program trading, basket trading, block trading, and short sales. Finally, we look at current topics: insider trading, rogue traders, market manipulation, and retail trading platforms and MEME stocks.

Learning Goals:
1. To develop a thorough understanding of how securities are traded around the world, how traders (retail and institutional) can minimize their costs of trading, and how market makers can optimally set prices and execute orders.
2. To understand the role of regulation, and how it impacts participants in the securities industry.
3. To gain first-hand experience in securities trading and market making in a realistic interactive simulation environment.

Required Materials:
Class-notes (slides) and other required reading materials will be distributed via Carmen.

Evaluation Criteria:

Graded Components	% of Total	Type
Quizzes (4)	20%	N
Cases: UG quizzes (2/3)	20%	O
Cases: Grad write-ups (2/3)	20%	O
Final Exam	25%	N
In-class Participation	10%	O
Trading Siumlations	25%	O

(See details and deadlines below)

Requirements for each form of graded component.
Failing to follow these will represent academic misconduct. See below.

Independent Work [N]: Strictly non-collaborative, original individual work. You may discuss this assignment with your instructor only. Discussions with other individuals, either in person or electronically, are strictly prohibited.

Collaboration Required [C]: An explicit expectation for collaboration among students either in class or outside of class (i.e. group work).

Collaboration Optional [O]: Students are permitted, but not required, to discuss the assignment or ideas with each other. However, all submitted work must be one's original and individual creation.

Academic Conduct:
If a student is suspected of, or reported to have committed, academic misconduct in this course, I am obligated by University Rules to report my suspicions to COAM. If you have questions about the above policy or what constitutes academic misconduct in this course, please contact me. See OSU Prohibited Conduct – Section 3335-23-04(A)

University Policies, Services and Resources (go.osu.edu/UPolicies)

Fisher Undergraduate Handbook and QuickLinks (www.bsbalinks.com)

Fisher Navigator Resource Portal (www.nav-1.com)

Target Students:
This course is primarily targeted towards students thinking of a carreer in investment management, securities trading, or the brokerage industry. It is also an excellent course to take for students targeting a carreer as a financial advisor. However, the course will also be useful for students interested in finance more generally. In the course, we will show that market structure and regulation affect asset pricing, and hence the cost of capital for firms around the world. Students taking this course will most certainly get a "leg-up" on the competition for summer jobs and hopefully also permanent jobs in the securities industry.

Prerequisites:
The course is offered in combined sections of KAIST, MBA, SMF, and UG students. KAIST students need instructors permission, SMF students must have taken their core finance class, and MBA students must have taken MBA 6221 and 6222 (or MBA 6223). UG students must have taken BUSFIN 3220. In addition, background in microeconomics is useful because the notions of supply, demand and economic equilibrium underlie just about every trading situation. Statistics comes in handy when we need to design strategies in situations involving risk or evaluate performance of existing markets.

Workload Expectation:
The university and college expectation is that students spend two hours outside of class for every hour spent in class. Since this course meets 3 hours per week, you should expect to spend 6 hours per week outside of class on course-related work.

Additional Course Material:
Examples of books that you may want to consult include:

- *Algorithmic Trading - A Practitioner's Guide*, TBG Press, 2020, by Jeffrey M. Bacidore.
- *Market Liquidity,* 2013, Oxford University Press, by Thierry Foucault, Marco Pagano, and Ailsa Röell
- *Financial Markets and Trading,* 2011, Wiley, by Anatoly B. Schmidt.
- *The Microstructure of Financial Markets,* 2009, Cambridge University Press, by Frank de Jong and Barbara Rindi.
- *Equity Markets in Action*, 2004, *Wiley*, by Professor Robert A. Schwartz and Reto Francioni. The textbook is available for free as an ebook through the Ohio State University Library.
- *Trading & Exchanges: Market Microstructure for Practitioners*, 2002, Oxford University Press, by Larry Harris.

Quizzes:
There are four online quizzes for all students (UG also have case quizzes – see below). Quizzes each have a maximum of 5 points for a total of 20 points. Students may drop the lowest graded quiz out of the four, and replace it with an optional make-up quiz.

Cases:
There will be three cases assigned in the later part of the course. In preparation for the in-class case discussions, study questions are available on Carmen. Graduate students (KAIST, MBA, and SMF) are expected to analyze the cases, and write a 3 page summary of his or her findings (not just a case synopsis) for two of the three cases which is due before class. Undergraduate students will be instead be given a short quiz at the beginning of case-discussion class, but I will drop the lowest case quiz grade (so two out of three are counted). All students are expected to participate actively in the in-class case discussion.

Final Exam:
There will be a Final Exam during exam week. More information will be available on the Carmen course page.

In-class Participation:
A substantial portion of your grade (10%) will be based on class participation, which includes attendance (5%) and active class participation (5%). Class participation will graded based on your contributions to case discussions, as well as general participation in the form of questions and comments during lectures. A combination of cold-calling and soft-calling will be used to maximize participation. Each student will be given ample opportunity to contribute to the classroom discussion. I will monitor contributions daily, and will cold-call students who need encouragement to speak up in class.

Trading Simulations:
We will use several trading simulations in the course, and your simulation performance during the two-day Trading competition accounts for 25% of your grade. I will grade you based on your in-section rank, and will base your score based on your best day in terms of performance relative to your class mates. The trading simulations cover learning from order flow, position management, as well as liquidity provision. The simulation software -- Rotman Interactive Trader (RIT) -- is based on a software package designed by the staff in the trading laboratory at the Rotman School, University of Toronto. Fisher College holds a site license to RIT software. Students are encouraged to practice using the RIT software throughout the course. More information about the simulations will be provided on the class Carmen web-page.

Additional Policies:

Examination Policy:
Missed exams can only be made-up in extreme cases (e.g., death of family member, personal hospitalization, etc.) with proper documentation (e.g., a physician's note, ER paperwork, obituary, etc.). Each decision of potentially allowing a make-up exam is made by the instructor on a case-by-case basis. Additionally, you MUST contact the instructor (werner.47@osu.edu) as soon as you know of a potential problem or conflict with an exam date. Alternative methods (e.g., oral exam, essay) of testing may be used for make-up exams. If you are experiencing an extreme situation or emergency, please attempt to notify the instructor (werner.47@osu.edu) via email ASAP.

Attendance:
Any student who fails to attend without giving prior notification to the instructor will be dis-enrolled after the third instructional day of the term, the first Friday of the term, or the second scheduled class meeting of the course, whichever occurs first. If you are unable to attend a particular class, please notify the instructor of your absence *prior* to that class. Failure to notify the instructor of absences, or missing more than five (5) sessions during the course, might result in a failing grade. Note, I take attendance virtually every class. Absence from the trading competition will not be excused, except for the most serious circumstances. Such circumstances must be validated in writing by an appropriately accredited professional (e.g., medical doctor).

In-person Class:
Note that the class is designated as an in-person class. The class-room we use is a lab space without a regular video setup. There is no hybrid option.

COVID:
The class will follow the University's "Safe and Healthy" plan and personal safety practices. If you have cold or flu symptoms, please notify me and get tested as soon as possible and do not come to class until a negative test result has been confirmed. Should you require accommodation due to Covid exposure/infection please notify me asap (forward accommodation instructions from SLDS). I will need to request a video camera on tripod for temporary use. Note that this typically cannot be accomplished the day of class as I teach three sections.

Accessibility:
The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services (SLDS). If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. If one class is missed due to COVID exposure/self-isolation, contact me immediately so that we can agree on make-up arrangements. If more than one class is missed due to mandatory quarantine or illness, students should contact SLDS via the link above for support in identifying appropriate accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Academic Conduct:
Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "academic misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, submitting the same or similar work for credit in more than one class, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If a student is suspected of, or reported to have committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to COAM. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Appeals:
Grading errors should be corrected. Appeals must be in writing, within 1 week after the graded work is returned—not the date you first look at it. The appeal should include a description of the question(s) that need to be reexamined as well as an explanation of why the original grade was incorrect. In general, the entire document will be checked for grading errors, and correcting these could either raise or lower the overall score.

Disability Services:
Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.

Waitlisted students:
Students who are waitlisted and seek to enroll must attend class through the first class session of the second week of the session. After that date, students who have not been added will not be enrolled and may not continue to attend the class. Waitlisted students should contact either the Fisher Undergraduate Program Office or the Department of Finance office if they have any questions regarding the waitlist process.

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Primitives and Market Structure

10/17 Topics:
- US Market Structure
- Orders, Bids, Offers, Spreads

Readings:
SEC Staff Report on Algorithmic Trading in U.S. Capital Markets, 2020, Sections I - III, and X
Securities Trading: Front, Middle, and Back Office, HBS 9-110-070

10/19 Trading Simulation: Order Driven Markets
LT3 - Dynamic Order Arrival

Information and Prices

10/24 Topics:
- Call Auctions
- Continuous Trading
- From Information to Prices

10/26 RIT Trading Simulation: Price Discovery
PD0 - Market Equilibrium
PD1 - IPO Pricing
PD2 - Asymmetric Information
PD3 - ETF Arbitrage Pricing
Quiz 1: Orders, Bids, Offers, and Spreads

Intermediated Markets

10/31 (Note: I have to reschedule the afternoon section, 3:20-4:40pm)
Topics:
- Risk-Neutral Models
- Models with Risk-Aversion
- Glosten-Milgrom Model

12/2 RIT Trading Simulation: Sales and Trading
LT1 – Trading as a Principal (Review)
LT2 – Orders in Illiquid Markets
Quiz 2: Trading Protocols and Information

Institutional Trading

11/7 Topics:
- Best Execution
- Order Submission Strategies
- Trading Cost Analysis

Readings:
Bacidore J. and G. Sofianos, 2002, Large Order Execution Quality, *Goldman Sachs*
Bacidore J. and G. Sofianos, 2003, Choosing The Best Execution Strategy, *Goldman Sachs*
Cai., T., and G. Sofianos, 2006, Multi-day Executions, *The Journal of Trading*, Summer, 25-33.
Frazzini , A., R. Israel, and T. J. Moskowitz, 2018, Trading Costs, SSRN Working Paper No 3229719
Natixis Algorithmic Trading Overview, 2021
Rakhlin, D., and G. Sofianos, 2006, The Impact of an Increase in Volatility on Trading Costs, *The Journal of Trading*, Spring, 43-50.
Rakhlin, D., and G. Sofianos, 2006, The Choice of Execution Algorithm: VWAP or Shortfall, *The Journal of Trading*, Winter, 26-32.
SEC Staff Report on Algorithmic Trading in U.S. Capital Markets, 2020, Sections IV-V

11/9 RIT Trading Simulation: Sales and Trading
LT3 – Dynamic Order Arrival
LT4 – Microstructure Capstone Case
Quiz 3: Market Making and Institutional Trading Costs

Trading Competition

11/14 RIT Trading Simulation
Competition- Part I

11/16 RIT Trading Simulation
Competition – Part II

Current Topics

11/21 **Insider Trading**

Readings:
Altman, P. et al, New "Shadow Insider Trading:" SEC Enforcement Action, *JD Supra*, August 25, 2021.
Background on Insider Trading Liability, HBS 9-320-080 (January 13, 2020).
Conaghan, T., E. Goldman, and E. Orsic, SEC Committee Supports Chairman's Call to Reform Rule 10b5-1 Trading Plans, *JD Supra*, September 1, 2021.
White & Case LLP, SEC Extends the Misappropriation Theory of Insider Trading Beyond Targets of Acquisitions to Companies "Economically Linked" to Such Targets, *Lexology*, September 9, 2021.

Case: Martha Stewart (A), HBS Case 9-305-034.
Case Quiz 1: Martha Stewart (A)

11/28 **Payment for Orderflow, Meme Stocks, and Gamification**

Readings:
Barber, B., Huang, X., Odean, T., and C. Schwarz, 2020, Attention-Induced Trading and Returns: Evidence from Robinhood Users, Working Paper. Available on SSRN.
Jones, C., Reed, A., and W. Waller, 2021, When Brokers Restrict Retail Investors, Does the Game Stop? Working Paper. Available on SSRN.

Case: Robinhood Markets Inc.: Business Model Challenges, Ivey Publishing W21231.
Case Quiz 2: Robinhood Markets Inc.: Business Model Challenges

11/30 **Market Manipulation, Ponzi Schemes, and Rogue Traders**
Readings:
Madhavan, A., D.J. Leinweber, 2001, Three Hundred Years of Stock Market Manipulations, *The Journal of Investing*, Summer.
Kyle, A. S., and S. Viswanathan, 2008, How to Define Illegal Price Manipulation, *AER Papers & Proceedings*, 98(2), 274-279.

Case: Societe Generale (A): The Jerome Kerviel Affair, HBS Case 110029.
Case Quiz 3: Societe Generale (A): The Jerome Kerviel Affair

12/5 **Dark Pools, Algorithms, and High Frequency Trading**

Money & Speed: Inside the Black Box (Flash Crash 2010)
Quiz 4: Money & Speed: Inside the Black Box (Flash Crash 2010)

Readings:
SEC Staff Report on Algorithmic Trading in U.S. Capital Markets, 2020, Sections VI-VIII
Abrokwah, K., and G. Sofianos, 2006, Accessing Displayed and Non-Displayed Liquidity, *The Journal of Trading*, Fall, 47-57.
Aguilar, L. A., Shedding Light on Dark Pools, Statement by SEC Commissioner, November 18, 2015.
Aquilina, M., E. Budish, and P. O'Neill, *Quantifying the High-Frequency Trading "Arms Race,"* FCA Occational Paper No. 50, January 2020.
Mackintosh, P., A Deep Dive into Dark Trades, Traders Magazine, April 30, 2021
Osipovich, A., Ultrafast Trading Costs Stock Investors Nearly $5 Billion a Year, Study Says, *The Wall Street Journal*, January 27, 2020.
Sofianos, G., 2007, Dark pools and algorithmic trading, Chapter 6 in Algorithmic Trading Handbook, 2nd edition, Goldman Sachs.

12/7 **Exam Prep**

Note: This session is voluntary and will be taught via zoom.