

**Business F770  
Financial Economics and Quantitative Methods  
Fall 2024 Course Outline**

**Finance and Business Economics  
DeGroote School of Business  
McMaster University**

***COURSE OBJECTIVE***

This course explores the theoretical and conceptual foundations of finance. It seeks to explain the decisions taken by various participants of the financial markets, the pricing of financial instruments, and various observed market phenomena.

***INSTRUCTOR AND CONTACT INFORMATION***

**Clarence C.Y. Kwan**

Professor of Finance

E-mail: [kwanc@mcmaster.ca](mailto:kwanc@mcmaster.ca)

Office Hours: by Appointment

**Class Time**

Monday, September 9 to December 9, 3:00 to 6:00 p.m.

Unavoidable scheduling changes, if any, will be brought to the attention of the class in advance.

**Important Notice**

For email communications with the instructor, please always use a McMaster University email account and “Business F770” or “F770” for the subject heading.

***COURSE ELEMENTS***

Credit Value: 3	Leadership: No	IT skills: No	Global view: Yes
Avenue: Yes	Ethics: Yes	Numeracy: Yes	Written skills: Yes
Participation: Yes	Innovation: Yes	Group work: No	Oral skills: Yes
Evidence-based: Yes	Experiential: No	Final Exam: Yes	Guest speaker(s): No

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## ***COURSE DESCRIPTION***

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Topics covered in this course are as follows: Consumption and investment decisions under certainty; utility theory; stochastic dominance; state preference theory; mean-variance portfolio theory; asset pricing and market equilibrium; mean-variance spanning; alternative portfolio frameworks; option properties and option pricing models; theory of capital structure; dividend policy; concepts of risk sharing; principal-agent problem and incentive contracting. Required statistical tools are covered as well.

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## ***LEARNING OUTCOMES***

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This course formally covers various fundamental topics in finance. As most analytical results are derived, the approach will enable each student to understand more fully the implications and the limitations of such results and to relate them properly to empirical evidence. Upon successful completion of the course, each student will have a solid theoretical foundation for studying various advanced topics in finance afterwards.

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## ***REQUIRED COURSE MATERIALS AND READINGS***

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There is no textbook for this course. The required reading materials are primarily in Clarence C.Y. Kwan, *Business F770, Financial Economics and Quantitative Methods: Lecture Notes*, Fall 2024 (hereafter, *Lecture Notes*).

The *Lecture Notes* in the current form are not intended for general distributions. Electronic access via a password is provided primarily to students registered in the Fall 2024 class of Business F770 at McMaster University. The electronic files will be posted on the course site on McMaster's Avenue-to-Learn. It is each student's responsibility not to forward such files to others.

If further descriptions, clarifications, and/or explanations of some materials covered in the *Lecture Notes* – especially those involving mathematical and statistical topics, as well as institutional procedures and practices – are needed, students are encouraged to use reliable online resources, such as Wikipedia and Investopedia. However, as the quality of online information cannot be held to the same standard as that of peer-reviewed publications, caution is needed when assessing the credibility of any online materials.

Specific reading materials are listed on pages 9-15 of the course outline. As some essential course materials draws on T.E. Copeland, J.F. Weston, and K. Shastri, *Financial Theory and Corporate Policy, Fourth Edition*, (2005), Pearson Addison Wesley, Boston, MA; ISBN 0-321-12721-8 (hereafter, *CWS*), references to the corresponding chapters in *CWS* are provided when applicable.

All peer-reviewed journal articles listed in the course outline, as well as any additional journal articles assigned during the Term, can be accessed electronically (by registered students) from the McMaster libraries website. There will also be some *Supplementary Notes* by the instructor, to be distributed to class, as additional reading materials.

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## **EVALUATION**

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There are two components for evaluation:

1. The percentage marks of a series of assignments, 50%.
2. The percentage marks of the final (cumulative) examination, 50%.

The use of word-processing software that can handle mathematical symbols is required for each assignment. The details about the feedback process – until each assignment is deemed *completed* – will be provided in class. Please note that the course materials of Business F770 in Fall 2024 will account for 40% of the Finance PhD Comprehensive Examination in June 2025.

The conversion of numerical grades to letter grades is as follows:

<b>Grade</b>	<b>Points</b>	<b>Equivalent Percentages</b>
A+	12	90 – 100
A	11	85 – 89
A-	10	80 – 84
B+	9	77 – 79
B	8	73 – 76
B-	7	70 – 72
F	0	69 and under

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## **COMMUNICATION AND FEEDBACK (DUPLICATED VERBATIM FROM THE TEMPLATE)**

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Students who wish to correspond with instructors or other TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Program Administrator.

Students who have concerns about the course content, evaluation methods, or delivery should first reach out to the course instructor. If your concern remains unresolved after speaking with the instructor, you may then reach out to the relevant Area Chair for further consideration.

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## ***ACADEMIC INTEGRITY (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity)

Students are responsible for being aware of and demonstrating behaviour that is honest and ethical in their academic work. Such behaviour includes:

- following the expectations articulated by instructors for referencing sources of information and for group work;
- asking for clarification of expectations as necessary;
- identifying testing situations that may allow copying;
- preventing their work from being used by others (e.g., protecting access to computer files); and
- adhering to the principles of academic integrity when conducting and reporting research.

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## ***AUTHENTICITY/PLAGIARISM DETECTION (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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**Some courses may** use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software.

**All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster’s use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

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## ***COURSES WITH AN ONLINE ELEMENT (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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**All courses** use some online elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course.

Students may be required to use the Respondus LockDown Browser and Respondus Monitor. The Respondus LockDown Browser is a downloadable program that allows a student to take an Avenue to Learn quiz in a secure environment. Quizzes can be set to use LockDown Browser or LockDown Browser.

For more details about McMaster's use of Respondus Lockdown Browser please go to <https://avenuehelp.mcmaster.ca/exec/respondus-lockdown-browser-and-respondus-monitor/>

The available information is dependent on the technology used. Continuation in a course that uses online elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

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## ***ONLINE PROCTORING (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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**Some courses may** use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

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## ***CONDUCT EXPECTATIONS (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [\*Code of Student Rights & Responsibilities\*](#) (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx, Teams, or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

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## ***ATTENDANCE (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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Arriving late or missing class disrupts the learning experience for both you and your peers. Punctuality and attendance are crucial to maintaining a respectful, professional and productive environment for everyone, including our faculty.

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## ***MISSED ACADEMIC WORK (DUPLICATED VERBATIM FROM THE TEMPLATE)***

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### ***Missed Tests / Assignments/ Class Participation***

Please do not use the online McMaster Student Absence Form (MSAF) as this is for Undergraduate students only. The PhD program will not accept an MSAF.

For scheduled courses where the end date is known and aligns to sessional dates, a grade must be supplied by the end of the course. Under exceptional circumstances a course instructor may approve an extension for the student for the completion of work in a course but must assign an Incomplete grade (INC) at the end of the course. Normally this extension is in the range of a few weeks. A student who receives an incomplete grade must complete the work as soon as possible, and in any case early enough to allow the instructor to report the grade by the sessional deadline noted as 'Final Date to Submit Results of Incomplete Grades'. If the INC grade is not cleared by the deadline, normally an F grade will be entered.

If a student is approved for an extension, they and instructors should make arrangements and submit an Incomplete (INC) Grade Memo to [busphd@mcmaster.ca](mailto:busphd@mcmaster.ca). If the student is not able to complete their course requirements by the INC deadline, they should submit a [Request for Extension](#) and be specific regarding the new deadline.

Missing Grade Memo is required if instructors are unable to submit any grades via Mosaic. The instructor must submit a Missing Grade Memo to [busphd@mcmaster.ca](mailto:busphd@mcmaster.ca).

Reasons for Incomplete course work can include:

- Health-related or extenuating circumstances
- Representing the University at an academic or varsity event
- Religious obligations
- Conflicts between two (or more) overlapping scheduled assignments.

### **Failing a Course**

Failure a course is reviewed by the appropriate Faculty Committee on Graduate Admissions and Study or the Associate Dean Graduate Studies in the Faculty. The Faculty Committee on Graduate Admissions and Study or the Associate Dean Graduate Studies requests a departmental recommendation regarding the student, and this recommendation is given considerable weight. In the absence of a departmental recommendation to allow the student to continue, the student will be required to withdraw. Those allowed to remain in the program must either repeat or replace the failed course or milestone, per the decision of the Faculty Committee on Graduate Admissions and Study. A failing grade in a Certificate, Diploma, Master's

or Doctoral course remains on the transcript. Students who fail a second course or milestone will not normally be allowed to continue in the program.

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**ACADEMIC ACCOMMODATION FOR STUDENTS WITH DISABILITIES**  
*(DUPLICATED VERBATIM FROM THE TEMPLATE)*

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Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. Students must forward a copy of such SAS accommodation to the instructor normally, within the first three (3) weeks of classes by setting up an appointment with the instructor. If a student with a disability chooses NOT to take advantage of an SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The SAS website is:

<http://sas.mcmaster.ca>

### **Process for Students**

- Students must activate their accommodation(s) (e.g., extra-time, memory aid, etc.) for each upcoming test, assignment, or exam, at least two weeks in advance. Students can do this by emailing their Instructor and the PhD Program Administrator ([busphd@mcmaster.ca](mailto:busphd@mcmaster.ca)). If a student cannot meet this deadline, they should contact to discuss alternative arrangements. The program is committed to exploring flexibilities where possible to support students.
- Students will leverage the accommodation (e.g., extra-time, memory aid, etc.), in a designated testing room. Rooms will be booked according to the student's SAS accommodation. Unless the accommodation states otherwise, students should expect that they will be writing in a room with other students. One or more invigilators will always be in the room. Students may also take their tests/exams at the SAS test centre on main campus.
- Following the request to activate the accommodation(s), [busphd@mcmaster.ca](mailto:busphd@mcmaster.ca) will reach out to the student with their test, assignment, or exam details, including the date, time, and room number.

All policies and procedures, including restroom access, how extra-time is allocated for assessments under Universal Design, and the submission of memory aids in advance, are consistent with those of SAS on Main Campus. The only variance in procedure is communication around, and physical location of, assessment. There is not a dedicated testing space at RJC or DSB. Existing classrooms and lecture halls will be used for most testing. All SAS-approved accommodations will be honoured by our staff; however, core testing elements are not eliminated in alternative testing formats. Students should expect and plan for invigilation, incidental noise, and other potential distractions.

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## **ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO) (DUPLICATED VERBATIM FROM THE TEMPLATE)**

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Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to the SEAO (Student Experience Academic Office) **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

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## **COPYRIGHT AND RECORDING (DUPLICATED VERBATIM FROM THE TEMPLATE)**

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Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

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## **POTENTIAL MODIFICATION TO THE COURSE (DUPLICATED VERBATIM FROM THE TEMPLATE)**

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The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

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## **ACKNOWLEDGEMENT OF COURSE POLICIES (DUPLICATED VERBATIM FROM THE TEMPLATE)**

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Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of PhD XXXX will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.



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## **ARTIFICIAL INTELLIGENCE**

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Students may use generative AI for their work throughout the course so long as the use of generative AI is referenced and cited. Use of generative AI outside the stated use without citation will constitute academic dishonesty. It is the student's responsibility to be clear on the limitations for use and to be clear on the expectations for citation and reference and to do so appropriately.

For additional information and guidelines:

[Generative Artificial Intelligence - Academic Excellence - Office of the Provost \(mcmaster.ca\)](https://www.mcmaster.ca/academic-excellence/generative-ai)

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## **MORE DETAILED COURSE DESCRIPTION AND CORRESPONDING READING MATERIALS**

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The additional reading materials are primarily original research articles on the corresponding topics. Each journal article indicated with an asterisk (\*) is a pedagogic version. The number of listed articles depends on the intended depth of coverage of the topics involved.

### **0. Preliminaries**

*Lecture Notes*, Chapter 1.

### **1. Consumption and Investment Decisions under Certainty: A Brief Review**

In a world that is characterized as being without risk, an individual seeks to optimize his/her satisfaction from current and future consumptions. Any forgone current consumption will allow the individual to have a higher consumption in the future. We seek to understand how rational decisions are made under different characterizations of the economy.

*Lecture Notes*, Chapter 2.

*CWS*, Chapter 2.

### **2. Utility Theory: A Brief Review**

We examine an individual's attitude towards risk. The concepts of risk aversion, risk premium, and certainty equivalent are considered. We also use some specific utility functions to illustrate these various concepts.

*Lecture Notes*, Chapter 3.

*CWS*, Chapter 4.

J.W. Pratt, "Risk Aversion in the Small and in the Large," *Econometrica*, 32 (1-2), (1964), 122-136.

### **3. Stochastic Dominance**

For two competing investments with risky outcomes, we are interested in knowing whether one of them is always a better choice for a rational investor. We first consider a case where the investor's attitude towards risk does not matter. We then consider a different case where it does matter.

*Lecture Notes*, Chapter 4.

*CWS*, Chapter 4.

J. Hadar and W.R. Russell, "Rules for Ordering Uncertain Prospects," *American Economic Review*, 59 (1), (1969), 25-34.

### **4. State Preference Theory**

In this theory, the future is characterized as some potential states of nature with corresponding probabilities of occurrence. With the payoffs from individual financial securities being state-dependent, we seek to determine security prices.

*Lecture Notes*, Chapter 5.

*CWS*, Chapter 5.

### **5. A Mean-Variance Framework**

This theory captures the risk of an investment with the variance of the probability distribution of the investment's random rates of returns. It provides guidance for allocating investment funds among the securities considered to achieve the best risk-return trade-off.

*Lecture Notes*, Chapter 6.

*CWS*, Chapter 6.

## 6. Basic Portfolio Selection Models and Related Issues

We explore analytical properties of minimum-variance portfolios. We provide a formal treatment of mean-variance portfolio analysis, based on a basic portfolio selection model. A crucial requirement for the covariance matrix of security returns is identified, and its implications are explored.

*Lecture Notes*, Chapters 7 and 18.

*CWS*, Chapter 6.

R.C. Merton, "An Analytical Derivation of the Efficient Portfolio Frontier," *Journal of Financial and Quantitative Analysis*, 7 (4), (1972), 1851-1872.

R. Roll, "Critique of the Asset Pricing Theory's Tests," *Journal of Financial Economics*, 4 (2), (1977), 129-176. (Read only the Appendix, pp. 158-162.)

\* C.C.Y. Kwan, "The Requirement of a Positive Definite Covariance Matrix of Security Returns for Mean-Variance Portfolio Analysis: A Pedagogic Illustration," *Spreadsheets in Education*, 4(1), (2010), Article 4.

\* C.C.Y. Kwan, "Remedies for Misapplications of Sylvester's Criterion: A Pedagogic Illustration," *Spreadsheets in Education*, 12, Issue 3, (September 2021).

\* C.C.Y. Kwan, "A Pedagogic Note on the Inverse of the Sum of Matrices: Miller's Theorem and a Spreadsheet-Based Illustration," *Spreadsheets in Education*, 13, Issue 1, (July 2022).

## 7. Portfolio Selection without Short Sales and Some Related Topics

The Markowitz critical line method for portfolio selection is presented in some detail. The idea of critical lines is explained. For analytical convenience, the constraints considered are first confined to full allocation of investment funds and disallowance of short sales. Portfolio selection with investment limits for individual securities is also considered. The requirement for the covariance matrix of security returns, as identified earlier, is examined further here. Efforts to improve input quality are discussed. Shrinkage estimation of the covariance matrix of returns is introduced.

*Lecture Notes*, Chapters 8 and 9.

\* C.C.Y. Kwan, "A Simple Spreadsheet-Based Exposition of the Markowitz Critical Line Method for Portfolio Selection," *Spreadsheets in Education*, 2(3), (2007), Article 2.

C.C.Y. Kwan, "What Really Happens If the Positive Definiteness Requirement on the Covariance Matrix of Returns Is Relaxed in Efficient Portfolio Selection?" *Financial Markets and Portfolio Management*, 32(1), (2018), 77-110.

O. Ledoit and M. Wolf, “Honey, I Shrunk the Sample Covariance Matrix,” *Journal of Portfolio Management*, (Summer 2004), 110-119.

\* C.C.Y. Kwan, “An Introduction to Shrinkage Estimation of the Covariance Matrix: A Pedagogic Illustration,” *Spreadsheets in Education*, 4(3), (2011), Article 6.

\* C.C.Y. Kwan, “Shrinkage of the Sample Correlation Matrix of Returns Towards a Constant Correlation Target: A Pedagogic Illustration Based on Dow Jones Stock Returns,” *Spreadsheets in Education*, 10(1), (2017), Article 3.

## **8. Market Equilibrium Considerations**

We consider the impact of the collective investment decisions by individual investors on security prices and expected returns. Some market-equilibrium models, including the Capital Asset Pricing Model and its variants, as well as the Arbitrage Pricing Model, and the corresponding implications are considered.

*Lecture Notes*, Chapters 10-12.

*CWS*, Chapter 7.

W.F. Sharpe, “A Theory of Market Equilibrium under Conditions of Risk,” *Journal of Finance*, 19 (3), (1964), 425-442.

J. Lintner, “The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets,” *Review of Economics and Statistics*, 47 (1), (1965), 13-17.

J. Mossin, “Equilibrium in a Capital Market,” *Econometrica*, 34 (4), (1966), 768-783.

R. Roll, “Critique of the Asset Pricing Theory’s Tests,” *Journal of Financial Economics*, 4 (2), (1977), 129-176.

S.A. Ross, “The Arbitrage Theory of Capital Asset Pricing,” *Journal of Economic Theory*, 13 (3), (1976), 341-360.

\* C.C.Y. Kwan, “The Arbitrage Pricing Model: A Pedagogic Derivation and a Spreadsheet-Based Illustration,” *Spreadsheets in Education*, 9(1), (2016), Article 4.

## **9. Mean-Variance Spanning**

Under the mean-variance framework, we examine the spanning conditions; that is, the conditions under which the addition of a set of extra assets does not improve the portfolio performance in terms of risk-return trade-off. We also explore some practical implications of spanning.

*Lecture Notes, Chapter 13.*

G. Huberman and S. Kandel, "Mean-Variance Spanning," *Journal of Finance*, 42(4), (1987), 873-888.

J.D. Jobson and B. Korkie, "A Performance Interpretation of Multivariate Tests of Asset Set Intersection, Spanning, and Mean Variance Efficiency," *Journal of Financial and Quantitative Analysis*, 24, (1989), 185-204.

M. Raab and R. Schwager, "Spanning with Short-Selling Restrictions," *Journal of Finance*, 48(2), (1993), 791-793.

G.V.G. Stevens, "On the Inverse of the Covariance Matrix in Portfolio Analysis," *Journal of Finance*, 53(5), (1998), 1821-1827.

C.S. Cheung, C.C.Y. Kwan, and D.C. Mountain, "On the Nature of Mean-Variance Spanning," *Finance Research Letters*, 6, (2009), 106-113.

\* C.C.Y. Kwan, "A Regression-Based Interpretation of the Inverse of the Sample Covariance Matrix," *Spreadsheets in Education*, 7(1), (2014), Article 3.

## **10. Stochastic Dominance, Mean-Gini, and Asset Pricing**

We consider an alternative analytical framework, where risk of an asset is measured by its Gini coefficient. Various analytical issues pertaining to stochastic dominance and asset pricing are examined here.

*Lecture Notes, Chapter 14.*

R. Dorfman, "A Formula for the Gini Coefficient," *Review of Economics and Statistics*, 61, (1979), 146-149.

S. Yitzhaki, "Stochastic Dominance, Mean Variance, and Gini's Mean Difference," *American Economic Review*, 72(1), (1982) 178-185.

H. Shalit and S. Yitzhaki, "Mean-Gini, Portfolio Theory, and the Pricing of Risky Assets," *Journal of Finance*, 39(5), (1984), 1449-1468.

R.I. Lerman and S. Yitzhaki, "A Note on the Calculation and Interpretation of the Gini Index," *Economics Letters*, 15, (1984), 363-368.

\* C.S. Cheung, C.C.Y. Kwan, and P.C. Miu, “Mean-Gini Portfolio Analysis: A Pedagogic Illustration,” *Spreadsheets in Education*, 2(2), (2007), Article 3.

## **11. Options Properties and Option Pricing Models**

Various basic option properties are considered. Also considered are derivations of the Cox-Ross-Rubinstein binomial option pricing model and the Black-Scholes option pricing model, as well as the convergence of the two models.

*Lecture Notes*, Chapters 15-19.

*CWS*, Chapter 8.

F. Black and M. Scholes, “The Pricing of Options and Corporate Liabilities,” *Journal of Political Economy*, 81(3), (1973), 637-654.

J.C. Cox, S.A. Ross, and M. Rubinstein, “Option Pricing: A Simplified Approach,” *Journal of Financial Economics*, 7, (1979), 229-263.

\* Y. Feng and C.C.Y. Kwan, “Connecting Binomial and Black-Scholes Option Pricing Models: A Spreadsheet-Based Illustration,” *Spreadsheets in Education*, 5(3), (2012), Article 2.

\* K.D. Brewer, Y. Feng, and C.C.Y. Kwan, “Geometric Brownian Motion, Option Pricing, and Simulation: Some Spreadsheet-Based Exercises in Financial Modeling,” *Spreadsheets in Education*, 5(3), (2012), Article 4.

\* C.C.Y. Kwan, “Solving the Black-Scholes Partial Differential Equation via the Solution Method for a One-Dimensional Heat Equation: A Pedagogic Approach with a Spreadsheet-Based Illustration,” *Spreadsheets in Education*, 12, Issue 1, (September 2019).

## **12. Theory of Capital Structure**

Capital structure pertains to the corporate decision on how much debt and equity to have proportionally. The theory is considered with and without tax effects. Also considered is the effect of risky debt on capital structure, as well as risk sharing between debt and equity holders.

*Lecture Notes*, Chapter 20.

*CWS*, Chapters 13 and 14.

F. Modigliani and M.H. Miller, “The Cost of Capital, Corporation Finance and the Theory of Investment,” *American Economic Review*, 48 (3), (1958), 261-297.

F. Modigliani and M.H. Miller, “Corporate Income Taxes and the Cost of Capital: A Correction,” *American Economic Review*, 53 (3), (1963), 433-443.

### **13. Dividend Policy: A Brief Review**

Arguments for and against dividend relevance are considered. Also considered is the concept of information content of dividends.

*Lecture Notes*, Chapter 21.

*CWS*, Chapters 15 and 16.

### **14. Basic Concepts of Risk Sharing**

The coverage includes two-party and multi-party cases. Efficiency conditions for uncorrelated and correlated random outcomes are considered. Examples in the context of corporate merger are provided.

*Lecture Notes*, Chapter 22.

### **15. The Principal-Agent Problem and Incentive Contracting**

Incentive contracting for situations where the agent's effort is observable and unobservable is considered. For the latter situation, also considered is the informativeness of indirect measures of the agent's effort. The intensity of incentives (in incentive contracting) is examined.

*Lecture Notes*, Chapter 23

*CWS*, Chapter 12.

M.C. Jensen and W.H. Meckling, "Theory of the Firm, Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, 3 (4), (1976), 305-360.

### **16. Appendices**

The two appendices of the *Lecture Notes* cover various topics in matrix algebra that are relevant for this course. The coverage includes, but is not limited to, determinants and eigenvalues, matrix operations, and positive semi-definite and positive definite matrices.

*Lecture Notes*, Appendices A and B.