

PPHA 32530 - Fundamentals of Municipal Bonds

Winter 2021

Tuesdays and Thursdays, 2:40-4pm via Zoom and Canvas
<https://canvas.uchicago.edu/courses/xxxx>

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Office Hours: T and R, 1-2pm
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Description and Objectives

Public organizations routinely borrow money to finance their capital investments and other strategic objectives. Those borrowings are typically done through “municipal bonds.” Today there are roughly \$4 trillion in municipal bonds issued by more than 50,000 unique entities, including municipalities, state governments, public utilities, universities, NGOs, and many other public organizations. This is a course about the structure and dynamics of the municipal bond market.

This course is organized around the perspectives and activities of three key municipal bond market participants: investors, credit analysts, and issuers. You’ll learn the conceptual frameworks they use to understand the market conditions in which they operate. You’ll learn about the policy and regulatory factors that shape the tactics they employ to respond to those conditions. Perhaps most important, you’ll apply some of the same analytical tools they use in their work. By the end of the course you’ll have a portfolio of work and several networking opportunities you can use to market yourself for jobs in this market.

Throughout the course we will employ a “theory to evidence to practice” approach. Every time we cover a new topic we’ll begin with an overview of the relevant theory on that topic. That body of theory includes concepts from economics and finance that you’ve likely encountered elsewhere in the Harris curriculum, such as: microeconomic theories of auction mechanisms and market competition; the Modigliani-Miller theorem; no-arbitrage pricing models; and public finance theories of optimal taxation and market failure, among others. After covering the relevant theory, we’ll then summarize the relevant academic and industry literature that describes how the municipal bond market actually works. Some of that literature is consistent with what theory predicts, but much of it is not. When theory and evidence diverge, we’ll explore why. After that you’ll learn and apply several key analytical tools based on that foundation of theory and evidence. Those tools include: term structure models, empirical models of municipal credit quality, bond sizing/debt service modeling, and others. You’ll use Excel extensively and, where necessary, you’ll use the finance modules from other statistics packages like R and Stata. Where appropriate, we will also invite guest presenters to describe their experiences in the market.

That said, by the end of this course, you will be able to:

- Apply key concepts of fixed income mathematics, including: yield-to-maturity, price, duration and convexity, among others.
- Identify the technical, macroeconomic, and idiosyncratic factors that drive investor demand for municipal bonds.
- Apply traditional term structure and bond pricing models to municipal bonds.
- Identify the unique public policy and regulatory/quasi-regulatory institutions that shape the municipal bond market, including and especially the tax exemption.
- Discern the factors that drive credit quality for different types of municipal bonds, and apply empirical models of those factors.
- Understand the institutions and procedural mechanics of the municipal bond issuance process.
- Identify the optimal borrowing terms for municipal bond issuers.
- Describe recent municipal bond market innovations in areas like derivatives, financial technology, investor relations, and market transparency.

The course will be especially useful for anyone who wants to work in in the public capital markets. This includes: the public and non-profit sector divisions of the major credit rating agencies; the municipal trading desks of investment banks and bond funds; independent public finance advisors; state agencies responsible for oversight of public agency debt management; relevant federal regulatory agencies like the Securities and Exchange Commission and the Internal Revenue Service; quasi-regulatory groups like the Municipal Securities Rulemaking Board or the Securities Industry and Financial Markets Association; interest groups that work on issues related to public debt; and many others. Consultants such as utility rate specialists, environmental impact analysts, elections and referenda consultants, and others are also directly involved in the public capital markets. Moreover, students who would like to work in the parallel of any of the above institutions in another country will also find the course valuable, as the US public capital market is, for better or worse, the model for sub-national public capital markets around the world.

You'll also find this course relevant if you intend to work in fiscal policy or financial management for a municipality, school district, public authority, large non-profit institution, or other public entity that issues debt. MPP graduates who go to work as budget analysts, capital projects analysts, and other entry-level positions in budgeting and financial management often find it useful to know the fundamentals of the public capital markets. Many capital-intensive public and non-profit organizations - such as Chicago Public Schools, the Illinois Department of Transportation, the Art Institute of Chicago, and many others - will assume entry-level budgeting/finance staff know where municipal bonds come from and why investors buy them.

Required Materials

There is no required textbook, and all reading assignments will be posted to the course Canvas page.

We will read excerpts from a few books:

1. Johnson, Craig, Marty Luby, and Tima Moldogaziev (2014). *State and Local Financial Instruments: Policy Changes and Management* (London, UK: Routledge).
2. Zipf, Robert (2003). *Fixed Income Mathematics*. (Elsevier).
3. Marlowe, Justin, William Rivenbark, and Jack Vogt (2009). *Capital Budgeting and Finance: A Guide for Local Governments* (International City/County Management Association).

I will also post a few additional readings throughout the quarter. Most will come from the *Bond Buyer*, *Governing* magazine, and other trade publications. Consider these additional readings required. Watch the Announcements section of the course Canvas site throughout the quarter.

You might find these other books useful:

1. Fischer, Philip (2013). *Investing in Municipal Bonds: How to Balance Risk and Reward for Success in Today's Bond Market* (New York: McGraw-Hill).
2. Mysak, Joe (2012). *Encyclopedia of Municipal Bonds: A Reference Guide to Market Events, Structures, Dynamics, and Investment Knowledge* (Bloomberg).
3. Zipf, Robert (1997). *How the Bond Market Works* (New York: New York Institute of Finance). Note: Zipf has another, now somewhat dated book under the same imprint called *How Municipal Bonds Work*
4. Livingston, Miles (2005). *Bonds and Bond Derivatives* (Malden, MA: Blackwell).
5. Finnerty, John D. and Emery, Douglas J. (2001). *Debt Management: A Practitioner's Guide* (Cambridge, MA: Harvard University Press).
6. Chance, Don M. and Brooks, Robert (2010). *An Introduction to Derivatives and Risk Management, 8th Edition* (Cengage).
7. Wilmott, Paul (2006). *Paul Wilmott on Quantitative Finance* (New York: John Wiley & Sons).

Course Structure and Expectations

This course is organized around four main components. Think of them as a sequence of four steps that you'll repeat for each topic. We'll cover most topics, although not all, in a single class meeting:

1. Readings introduce the core concepts and offer a few introductory examples.
2. For each topic I've recorded two or three short (typically ~20-30 minutes each) lectures in Panopto. In those lectures I cover the theory and evidence around each of topic. Where applicable, I also walk through the application of any relevant analytical tools in Excel, R, Stata, etc. Watch the lectures (multiple times, if necessary), take notes, and come to class prepared to discuss. We will also run a class discussion thread on Canvas to cover questions and concerns that you encounter as you complete the readings and review the lectures.
3. Readings and lectures are accompanied by practice problems. These problems are a self-diagnostic. You should complete them and check your answers against the sample solutions I provide.
4. Most class meetings will last approximately 50 minutes (from 2:40-3:30pm). Class meetings are shorter than scheduled because you will spend time each week reviewing the Panopto lectures in lieu of in-class lectures. We'll devote most class sessions to Q &A on the readings and Panopto sessions. Time permitting, we'll also discuss any current events that are relevant to the municipal bond market. We will also occasionally break into small groups for additional discussions. Note that class meetings with guest presenters (see the schedule) will last the entire 80 minutes events. Also plan that the next-to-last class meeting - our in-class competitive bond sale auction - will also last the entire 80 minutes. I'll record and archive all class sessions for anyone who's unable to attend.

Grading

Assignments and exams are weighted as follows:

Assignment/Exam	% of Your Grade
Problem Set 1 - Bond Math	15%
Problem Set 2 - Modeling the Muni Yield Curve	15%
Problem Set 3 - Credit Rating Empirical Model	15%
Problem Set 4 - Bond Sizing Exercise	15%
Group Exercise - Competitive Sale Simulation	30%
Participation	10%

I will follow the University of Chicago’s standard letter grade to GPA scale. The final course percentages that correspond to each grade are listed here. I may adjust the final course percentage ranges if necessary:

Grade	GPA	Final Course %
A	4.0	93 and above
A-	3.7	90-92
B+	3.3	87-89
B	3.0	82-86
B-	2.7	76-81
C+	2.3	70-75
C	2.0	64-69
F	Fail	<64
Inc.	Incomplete	

Diversity and Inclusion

The Harris School welcomes, values, and respects students, faculty, and staff from a wide range of backgrounds and experiences, and we believe that rigorous inquiry and effective public policy problem-solving requires the expression and understanding of diverse viewpoints, experiences, and traditions. The University and the Harris School have developed distinct but overlapping principles and guidelines to insure that we remain a place where difficult issues are discussed with kindness and respect for all.

- The University’s policies are available here. Specifically, the University identifies the freedom of expression as being “vital to our shared goal of the pursuit of knowledge, as is the right of all members of the community to explore new ideas and learn from one another. To preserve an environment of spirited and open debate, we should all have the opportunity to contribute to intellectual exchanges and participate fully in the life of the University.”
- The Harris School’s commitments to lively, principled, and respectful engagement are available here and are summarized as follows: “Consistent with the University of Chicago’s commitment to open discourse and free expression, Harris encourages members of the leadership, faculty, student body, and administrative staff to respect and engage with others of differing backgrounds or perspectives, even when the ideas or insights shared may be viewed as unpopular or controversial.” We foster thought-provoking discourse by encouraging community members not only to speak freely about all issues but also to listen carefully and respectfully to the views of others.

Schedule (Subject to Change)

Date	Topic	Assignment Due
Tuesday, January 12	Overview of the Public Capital Markets	
Thursday, January 14	Bond Math Refresher	
Tuesday, January 19	No Arbitrage Pricing Models	Problem Set 1
Thursday, January 21	Term Structure Models	
Tuesday, January 26	Muni Demand Dynamics	
Thursday, January 28	Guest Presenter - TBA	
Tuesday, February 2	Muni Credit Analysis - Empirical Models	Problem Set 2
Thursday, February 4	Muni Credit Analysis - GO Bonds	
Tuesday, February 9	Muni Credit Analysis - Revenue Bonds	
Thursday, February 11	Muni Credit Analysis - Other Credit Factors	
Tuesday, February 16	Muni Credit Analysis - Forecasting Fiscal Stress	Problem Set 3
Thursday, February 18	Muni Sizing Models	
Tuesday, February 23	The Muni Issuance Process	
Thursday, February 25	Method of Sale	
Tuesday, March 2	Variable Rate Debt and Derivatives	
Thursday, March 4	Guest Presenter - Muni FA	Problem Set 4
Tuesday, March 9	Competitive Sale Simulation	
Thursday, March 11	Wrap-Up and Review	
Tuesday, March 16		Competitive Sale Exercise Report

Course Policies

- Attendance is not mandatory but please do let me know at least a week in advance if you know you need to miss a class. We'll move quickly through a lot of material, and you can easily fall behind. If you have to miss a class, whether it's a planned or unplanned, I'll be happy to meet with you during office hours or some other mutually agreeable time to answer your questions and concerns about what we covered during the class you missed.
- Please submit all assignments in PDF format through Canvas by 11:59pm on the due date. Some assignments will also require that you submit an Excel workbook through Canvas at the same time. I'll also share feedback on your assignments through Canvas.
- A late assignment will be penalized by a 10% grade reduction if it is submitted within 24 hours of the due date/time, and an assignment submitted 24-48 hours after the due date/time will be penalized by a 20% grade reduction. I cannot accept assignments more than 48 hours after the due date/time without prior notice. If you know you won't be able to complete an assignment by the deadline, please let me know immediately and we'll see if we can work out an alternative deadline.
- If you would like to contest a grade, you must do so in writing within one week of receiving your grade for that assignment or exam. Please follow the following process for contesting a grade:
 - E-mail me and include your reasoning for why you are requesting a re-grade referencing the suggested solutions.
 - I will respond by re-grading your entire assignment or exam according to their grading rubric. Note that this could result in your grade going up, going down, or staying the same.
- There is no required citation style or other requirements for written assignments.
- If you have questions about the readings, lectures, or practice problems, you'll likely find it helpful to first consult the discussion thread on Canvas. I'll monitor that thread and add to it periodically throughout the week. There's a good chance someone else has the same question and has posted it to that thread. That said, you should feel free to e-mail me at any time on anything related to the course, and I'll do my best to reply quickly.
- The University has developed specific policies and procedures regarding the use of video/audio recordings. According to those policies and procedures, by attending course sessions, you acknowledge that:
 - You will not: (i) record, share, or disseminate University of Chicago course sessions, videos, transcripts, audio, or chats; (ii) retain such materials after the end of the course; or (iii) use such materials for any purpose other than in connection with participation in the course.

- You will not share links to University of Chicago course sessions with any persons not authorized to be in the course session. Sharing course materials with persons authorized to be in the relevant course is permitted. Syllabi, handouts, slides, and other documents may be shared at the discretion of the instructor.
- Course recordings, content, and materials may be covered by copyrights held by the University, the instructor, or third parties. Any unauthorized use of such recordings or course materials may violate such copyrights.
- Any violation of this policy will be referred to the Area Dean of Students.

Academic Integrity

All University of Chicago students are expected to uphold the highest standards of academic integrity and honesty. Among other things, this means that students shall not represent another's work as their own, use un-allowed materials during exams, or otherwise gain unfair academic advantage.

- The University's policies regarding academic integrity and dishonesty are described here. It is worth explicitly stating the University's approach here: "It is contrary to justice, academic integrity, and to the spirit of intellectual inquiry to submit another's statements or ideas as one's own work. To do so is plagiarism or cheating, offenses punishable under the University's disciplinary system. Because these offenses undercut the distinctive moral and intellectual character of the University, we take them very seriously."
- The Harris School's policies are available in the Harris Student Handbook Canvas site.
 - The Academic Honesty and Plagiarism section expresses the main principles.
 - Detailed guidelines for more specialized student work (e.g., problem sets including computer code) are offered in the section titled Harris Integrity Policy for Problem Sets Involving Code.
 - Harris's specific procedures for handling suspected violations of these policies are available in the section Harris Procedures for Allegations of Plagiarism, Cheating, and Academic Dishonesty and are also re-produced as an Appendix to this syllabus.
 - All students suspected of academic dishonesty will be reported to the Harris Dean of Students for investigation and adjudication. The disciplinary process can result in sanctions up to and including suspension or expulsion from the University.
 - In addition to disciplinary sanctions, I will impose a grade penalty of "X" for students who have committed academic dishonesty.
 - Other penalties for violations could be imposed instead, alone or in combination. For example:
 - * Students will receive a grade of 0 on the exam or problem set in question as well as the next lowest problem set grade. This will often result in the student earning a failing grade in the course.

- * The student will receive a grade of 0 on the exam or problem set in question and cannot earn higher than a B- in the course, regardless of their performance on other assignments and exams.
- * At the instructors' discretion, the student may receive a failing grade for the course regardless of their performance on elements of the course.
- * Students found in violation of academic dishonesty will receive a failing grade in the course.
- * The student will receive a grade of 0 on the assignment or exam in question (subject to the discretion of the instructor).
- * The student may be asked to re-do the assignment or retake the exam (without credit) to ensure that the student has learned how to properly cite sources or demonstrate that he or she has command of material covered.

Disability Accommodations

The University's policies regarding students with disabilities are available here. Students who have disability accommodations awarded by the University Student Disability Services Office should inform the Harris Dean of Students office by the end of the first week of class. The Harris Dean of Students Office will work with the student and instructor to coordinate the students' accommodations implementation.

Harris students are not required to submit their accommodations letter to the instructor. Students from other divisions in the University must submit their accommodations letter to either the instructor or the Harris Dean of Students Office.

Students who do not yet have formal accommodations in place but who feel they need accommodations on a temporary or ongoing basis should contact the Harris Dean of Students Office or Student Disability Services.

Appendix: Full Harris Academic Integrity Procedures

Procedures for Allegations of Plagiarism, Cheating, and Academic Dishonesty

First Violation

If a student is accused by an instructor or teaching assistant of plagiarism, cheating, or any other form of academic dishonesty, the student will be summoned to meet with the Dean of Students and the instructor. In the meeting, the student and instructor both present information about the situation. If it is determined by the instructor and the Dean of Students that the student has, in fact, plagiarized or cheated, the following sanctions will be imposed for the first violation:

- The student will generally receive a grade of 0 on the assignment or exam in question. Please note that grading decisions are fully at the discretion of the instructor, who may decide to impose harsher grade penalties.
- The student may be asked to re-do the assignment or retake the exam (without credit) to ensure that the student has learned how to properly cite sources or demonstrate that he or she has command of material covered.
- A formal letter of finding is sent to the student stating that the student has been found in violation of the code of academic honesty and what the sanctions were. The letter, along with any evidence presented, is archived in Harris Student Affairs records until the student graduates if the student has no other violations.
- Students found in violation of the academic honesty policy are not permitted to withdraw from the course to avoid grade penalties from the instructor.
- In cases where plagiarism or academic dishonesty is egregious, the case may be referred to the Area Disciplinary Committee even on a first offense. The Dean makes all decisions about which cases will go before the Area Disciplinary Committee.

Second Violation

If a student who has already been found in violation academic dishonesty is again accused of academic dishonesty, the case will be sent to the Harris Area Disciplinary Committee. Details about the Area Disciplinary Committee procedures can be found in the University Student Manual. Information about the first violation, including the formal letter of finding any evidence, will be presented to the Area Disciplinary Committee, along with evidence of the current allegation. If the student is found in violation of academic honesty a second time, the Area Disciplinary Committee can assign sanctions including transcript notes, disciplinary probation, suspension or expulsion from the University.

Academic Dishonesty Appeals

If a student has been found in violation of academic honesty and does not believe that either the finding or the sanction is fair or correct, the student has the right to appeal the finding by requesting a hearing from the Area Disciplinary Committee. More information about the Area Disciplinary Committee is available [here](#).