NYU STERN
NEW YORK UNIVERSITY · LEONARD N. STERN SCHOOL OF BUSINESS

Real Estate Capital Markets
Course Syllabus

Fall 2013, GB.2339.30
M 6:00-9:00pm

Professor: Aurel Hizmo
Office hours: T 6-7pm, M after class,
Office: KMC 9-74
Homepage: http://sternclasses.nyu.edu/ (Blackboard)

E-mail: ahizmo@stern.nyu.edu
Classroom: TBA

Teaching Fellow: TBA
TF office hours: TBA
Office: TBA

Course outline

Real Estate Capital Markets studies debt and equity secondary markets linked to real estate assets. These markets have become a key way to funding residential and commercial real estate. The recent financial crisis saw a sharp contraction of new issuance in some of these markets, although others, such as the agency MBS market, became even larger and more central to mortgage finance.

On the debt side, we will study features of commercial and residential mortgages, and mortgage math (e.g. calculating mortgage points, prepayments and so on). We will then analyze agency and non-agency mortgage-backed securities, as well as some related instruments, such as CDOs. We will discuss the key factors that drive default risk and interest rate risk on commercial and residential mortgages, and learn the basic principles for the valuation of mortgage-backed securities, taking into account the value of the prepayment option embedded in such securities. We will cover the historical development of mortgage secondary markets, the institutional structure of this sector (e.g. the role of Fannie Mae, Freddie Mac and Ginnie Mae), and the process of securitization. We will also discuss alternative funding sources to securitization, such as covered bonds, syndication, deposit finance and FHLB advances. We will also discuss the causes and consequences of the current financial crisis, which has important implications for both commercial and residential real estate finance.

On the equity side, we will study Real Estate Investment Trusts (REITs), which are the primary traded equity structure used for real estate. This will include a discussion of the legal and institutional framework of the REIT industry, tax issues, and REIT valuation.

Since both debt and equity claims depend fundamentally on the value of the underlying real estate assets, we will also cover the measurement of real estate prices, recent market trends, fundamental determinants of prices, and valuation approaches.

We will also spend some time covering international aspects of real estate capital markets (e.g. covered bonds). Depending on time and class interests, we may also spend time covering other topics, such as real estate investment banking or Case-Shiller housing futures contracts.

Class time will be devoted to a mix of formal lectures, in-class exercises and guest lectures from Wall Street professionals. The course is a mix of qualitative and quantitative work. No

prerequisites beyond the Stern core classes are required or needed. But students should expect to be doing a fair amount of cashflow modelling in Excel, as well as fixed income mathematics.

Please note:

Real Estate Capital Markets has a somewhat different focus than other real estate classes offered at NYU Stern. Other courses generally take the perspective of a primary market real estate investor (e.g. a developer, a shopping mall operator etc.). In Real Estate Capital Markets, we generally take the perspective of a *secondary market investor*, such as an investor in mortgage backed securities, or the common equity of a REIT. The course places considerable emphasis on securitization, the housing finance system, the GSEs, the subprime mortgage crisis and related topics. The course will be relevant both to people with an interest in real estate, and those interested in fixed income markets.

Course Materials

Since most of the topics studied in the class are not well covered in any single text, there is no required textbook for the class. Primary materials for the course are the lecture notes, plus readings for each class that will be regularly posted on Blackboard. Some of these readings will be required, others will be optional or background reading for interested students. (This will be made clear on Blackboard). Other class materials such as assignments, practice exams, course announcements and so on will also be posted on Blackboard.

Although you will not need to purchase a textbook, you are asked to read the popular finance book Liar's Poker, by Michael Lewis. This will be discussed in Week 3. This book gives a clear, entertaining account of the birth of the mortgage-backed securities market. (The text is generally available on Amazon and in most bookstores.)

Lewis, Michael, 1989, Liar's Poker, Penguin Books, NY, NY, ISBN 0-393-02750-3. [The required chapters relevant to this course are Ch 5, 6 and 7, but the entire book is recommended].

Another (not required) book that we will refer to in Week 4 when we discuss the role of GSE's in the US residential real estate markets is:
"Guaranteed to Fail: Freddie, Fannie, and the Debacle of the U.S. Mortgage Finance", V. Acharya, M. Richardson, S. Van Nieuwerburgh.

We will also make reference to three Harvard Business School cases during the course, which will be available to purchase in physical and electronic form from the NYU bookstore:

"Mortgage-Backs at Ticonderoga", HBS Case 205-122, 2005. George Chacko, Peter Hecht, Vincent Dessain, Anders Sjoman.

"Rosetree Mortgage Opportunity Fund", HBS Case 9-209-088, 2009, Victoria Ivashina, Andre F. Perold.

"Cypress Sharpridge: Raising Capital in a Time of Crisis", HBS Case 9-310-140, 2010, Lena G. Goldberg, Adam Nebesar.

Although there is no required text, I've listed below a range of reference texts that will be useful for particular segments of the course. It is not necessary to buy any of these to master the

material covered in class. But students who want to gain a particularly in-depth understanding of the material should feel free to consult me about any of these books.

Financial calculator:
A financial calculator will be required for the course and for exams, to perform basic annuity and present value type calculations. Any financial calculator will do, as long as you understand how to use it. However, I will be using a Texas Instruments: TI - BA II Plus, and will sometimes refer to it in class. [N.B. Students interested in obtaining CFA certification should note that the two approved calculators for CFA exams are the TI - BA II Plus, and the Hewlett Packard: HP 12C.]

Course Assessment

The distribution of overall letter grades for the course will reflect Stern's guidelines. Your final course grade will be based on the following:

Assignments: 20% [dropping worst assignment grade]
Midterm quiz: 10% or 30%
Final exam: 60% or 40%.
Class attendance and participation: 10%

Note that there is some flexibility in the grading scheme, i.e. the balance between the midterm and final exam. Your midterm exam will be worth either 10% or 30% of your final grade, depending on how well you do in the midterm relative to the final. I'll correspondingly adjust the weight on the final exam (e.g. if your midterm weight is 30%, your final exam weight is 40%).

This adjustment will be done automatically by me in a way that maximizes your overall grade. The intention here is to provide some insurance for you in case you "have a bad day" on the date of the midterm or the final exam.

[Specifically, I'll shift the grades for the midterm and the final so they both have the same average across the whole class. I'll then assign weights of either 10% midterm versus 60% final exam, or 30% midterm versus 40% final exam, depending on which one maximizes your overall grade for the course].

Note that standard Stern grading policies (e.g. regarding distributions of letter grades) will apply to this class.

Assignments:
Five assignments will be given during the semester, consisting of cases and problem sets. You are encouraged to complete these in a group. See below for more details.

Exams:
The final exam and midterm quiz will consist of multiple choice questions, essay questions and problems. The final exam will assess material from the entire course, but with most of the emphasis being on content studied after the midterm exam.

The exam is entirely open book. Students will be allowed to bring all course materials to the exam and midterm quiz. Exam problems will be graded based on the process used; a correct answer without any working out will in general receive only partial credit. Students should bring a financial calculator to exams, as described above.

Class Participation:
Active and informed class participation is expected and strongly encouraged. 10% of your class grade is based on class attendance and participation. Enthusiastic and meaningful class participation will be rewarded. (N.B. This will reflect the quality of your comments, not just the quantity.)

To encourage discussion and interaction, students should bring their name tag to class, and display it clearly so that I and other people in the class can see it.

Assignments

There will be five assignments posted over the course of the semester. Your overall assignment grade will be based on the best four of your five individual assignments (i.e. you drop your worst score out of the five).

You are welcome, and in fact encouraged, to complete these assignments in a group of up to three people, and submit a single group answer. You should keep the same group for the entire semester. If you want me to find other group members for you, please send me an email, and I will assign you to a group with other people that contact me. When you submit your assignment online, please make sure you write the names of all the members of the group on the assignment.

Unless exceptional circumstances apply, late assignments will not be accepted. You are responsible if another member of your group fails to submit the assignment on time.

The due dates for the five assignments are as follows:

Assignment due dates:
Assignment 1: TBA
Assignment 2: TBA
Assignment 3: TBA
Assignment 4: TBA
Assignment 5: TBA

The assignment questions will normally be posted two weeks before the assignment is due.

Other Considerations

Attendance

Students are expected to make a good faith effort to attend each class. An attendance sheet will be handed around each class. Missing multiple classes without a good reason will be reflected in a lower class participation grade. Students are also expected to arrive to class on time and stay to the end of the class period.

Absences are acceptable in case of illness, family emergency, religious observance, or civic obligation. If you know in advance you'll miss classes due to religious observance or civic obligation, please inform me at the beginning of the course, or as soon as possible.

Note: Lecture materials as well as a video of each class will be posted on Blackboard, so if you do miss class for some reason, you will be able to catch up with the material that way.

Disabilities

If you have a qualified disability and will require academic accommodation during this course, please contact the Moses Center for Students with Disabilities (CSD, 998-4980) and provide me with a letter from them verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the CSD, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation.

Code of conduct

All students are expected to understand and follow the **Stern Honor Code:** (http://w4.stern.nyu.edu/scorp/committee.cfm?doc_id=4797)

A student's responsibilities include, but are not limited to, the following:

1. A duty to acknowledge the work and efforts of others when submitting work as one's own. Ideas, data, direct quotations, paraphrasing, creative expression, or any other incorporation of the work of others must be clearly referenced.
2. A duty to exercise the utmost integrity when preparing for and completing examinations, including an obligation to report any observed violations.

Reference materials

The books listed below are relevant for various aspects of the course, and at various points material from the books will be referred to in the lectures. Interested students who want to gain an in-depth understanding of particular aspects of the course should feel free to consult me about purchasing one or more of the texts below. None of them are required, however.

It should be noted that the texts listed below generally predate the current mortgage crisis, and often the boom in non-agency MBS that preceded it. For this reason, the books are generally a relatively better guide to the agency mortgage market.

Textbooks and technical books

1. Fabozzi, Bhattacharya and Berliner, "Mortgage-Backed Securities: Products, Structuring and Analytical Techniques", ISBN 978-0-470-04773-6, Wiley and Sons, 2011.

Well-written overview of mortgage and MBS fixed-income markets, including prepayment, default, valuation etc.

2. Davidson, Sanders, Wolff, and Ching, "Securitization: Structuring and Investment Analysis" ISBN: 978-0-471-02260-2, 576 pages, September 2003.

Covers a range of different securitization markets, not just MBS. Includes a good intuitive discussion of pricing and OAS.

3. Hayre, "Salomon Smith Barney Guide to Mortgage-backed Securities," Wiley and Sons, Inc, 2001.

Salomon Brothers pioneered the underwriting, trading and modeling of mortgage-backed securities in the 1980s, as described in Liar's Poker.

4. Fabozzi, 2006, "Handbook of Mortgage-Backed Securities", 6th Edition, McGraw-Hill Trade, ISBN 0-07-146074-8.

Contains chapters on various aspects of the MBS market, written by industry professionals. While lengthy and broad in scope, it is less useful than (1) as a pedagogical tool for learning about MBS markets.

5. Garrigan and Parsons, 1997, "Real Estate Investment Trusts: Structure, Analysis and Strategy", McGraw-Hill Irwin, ISBN 0-7863-0002-7.

Contains a wealth of institutional information about REITs.

6. Gelner, Miller, Clayton, Eichholtz, " Commercial Real Estate Analysis and Investments", 2006, 2nd Edition.

Great textbook for a general study of commercial real estate, but capital markets is not its main focus.

7. Brueggeman and Fisher, "Real Estate Finance and Investments", Irwin 2008, 13th Edition.

One of the most popular books for teaching the basics of real estate finance. Not strong on capital markets however.

8. Poorvu and Cruikshank, "The Real Estate Game: The Intelligent Guide to Decision-Making and Investment", Free Press 1999.

The books (6), (7) and (8) are useful overall texts on real estate finance and real estate investing (not specifically focusing on real estate capital markets).

Class schedule (draft: any updates will be posted on Blackboard)

Important dates:

TBA: First class
TBA: (no class)
TBA: MIDTERM QUIZ (60 minutes, start of class)
TBA: FINAL EXAM (120 minutes)

Week	Date	Material to be covered
1		**Introduction and real estate price dynamics** • Course outline and introduction • Measurement of commercial and residential property prices • Economic determinants of real estate prices • Primer on the US mortgage market
2		**Mortgages and mortgage calculations** • Structure of commercial and residential mortgage contracts • Mortgage mathematics (e.g. calculating points, NPV, prepayments etc.)
3		**The mortgage finance system, and mortgage risks** • Securitization and the funding of residential and commercial mortgages • Passthrough securities versus collateralized mortgage obligations (CMOs) • The GSEs and the TBA market • Mortgage risks: (i) interest rate risk, (ii) credit risk, (iii) prepayment risk
4		**Modelling prepayment risk** • Understanding prepayment risk • Modeling prepayment risk • Cash flow modeling of agency residential mortgage-backed securities (RMBS)
5		**Mortgage valuation, and CMOs** • Estimating expected returns: static yield spreads and option adjusted spreads (OAS) • Understanding CMOs • Cashflow modeling of CMOs HBS Case: Mortgage Backs at Ticonteroga
6		**Midterm quiz** (60 minutes, start of class) **Guest Lecture:** Matt Jozoff (JP Morgan)
7		**Modeling residential defaults, and the non-agency MBS market** • Non-agency market structuring (waterfalls etc.) • The subprime crisis • Government responses to the crisis

		HBS Case: Rosetree Mortgage Opportunity Fund
8		**Commercial real estate and commercial mortgages** • Introduction to commercial real estate • Structure and performance of commercial mortgages • Commercial Mortgage Backed Securities (CMBS)
9		**REITs** • Introduction to Real Estate Investment Trusts (REITs) **Guest lecture**: TBA.
10		**REITs (cont.)** • REITs: Tax treatment other benefits • REIT valuation methods HBS Case: Cypress Sharpridge: Raising Capital in a Time of Crisis
11		**Innovations and derivatives in real estate capital markets** • Innovations and features of foreign markets • Covered bonds, real estate futures • CDOs, CDS and synthetic CDOs • Course review and Q&A **Guest Lecture**: TBA
12		**Final exam [120 minutes]**