

**B8463 RESIDENTIAL REAL ESTATE: DIRT, DEBT AND DERIVATIVES
FALL 2019**

PROFESSOR: BRIAN P. LANCASTER¹

Phone: 860-898-0436

E-mail: blancaster.nyc@gmail.com

Office Hours: Please contact me and we can arrange a meeting or call.

TEACHING ASSISTANT

Section 1: Minh Phan, PhD Candidate

MPhan21@gsb.columbia.edu,

Phone: 281-785-7442 , office hours: by appointment

Communications from professor and teaching assistants about the course will take place through Canvas. Students should make sure they regularly check for announcements and messaging notifications.

SCHEDULE AND LOCATION

Section 1: Mon. & Wed. 10:45AM - 12:15PM

Classroom: Uris 140

COURSE DESCRIPTION

The focus of this course is the \$27 trillion U.S. housing market, the largest real estate market in the world, a topic of ongoing interest but with particular resonance this year as the President and Presidential candidates debate how to privatize the GSEs and address the acute current lack of housing affordability that has resulted in decreased home ownership, greater renting, record homelessness, and a massive backlog in manufactured housing as first time home buyers are shut out of the traditional stick built market. Where possible we will also include reference to non-U.S. housing markets such as comparing their mortgage finance systems with that of the U.S.

The course's objective is to teach the student how to develop, value, finance, and invest in residential real estate and residential real estate debt securities and derivatives as well as to understand how the US residential financing system works. Given its' broad and deep sweep, students will learn about a wide range of topics ranging from the importance of fits and finishes in selling homes in a new subdivision, to how to entitle land, to how blockchain is being used to disrupt the mortgage origination process, to how to create an Agency residential CMO companion bond. A range of housing types will be covered including: single family subdivisions, market rate urban condominiums, low and moderate income housing, workforce and student housing, manufactured housing, and senior residential living communities, and rental apartments. At the end of the course we will also focus on one selected overseas market. For Fall 2019 the focus will be China where housing accounts for two thirds of Chinese household assets and as such is one of the critical keystones supporting China's economy, government, and political stability. The three focuses of the course, the Dirt, Debt and Derivatives will each make up about one third of the course.

The course is recommended for Columbia Business School MBA, EMBA, PhD and MSc financial engineering students who wish to understand these markets better or who want to pursue careers or side businesses in developing and/or buying residential types of real estate, and/or trade, sell, research, or institutionally invest in residential real estate securities

¹ A brief biography of Professor Lancaster is at the back of this syllabus.

and derivatives. Cross registrants from SIPA, the School of Engineering, Law and Journalism schools who want to better understand how the US housing and housing finance system works are also welcome.

The approach of the course will be both theoretical and applied with an emphasis on the latter. In general topics will be covered first in a lecture/discussion format, followed by a case class with a senior practitioner discussing the topic with the class generally as they have experienced it and then a recent, actual, specific business situation (a “raw case”). An example of the number of different “raw cases” in the course would be the development of a condominium project in Manhattan led by a large residential developer operating in San Francisco, New York and Boston. The course will also feature highly regarded thought leaders as guest speakers leading case discussions on key topics, such as Hugh Frater, CEO, Fannie Mae, on the future of the US housing financing system, the founders/presidents of companies developing suburban market housing, urban condominiums, low and moderate income housing and the head of securitization at Barclays who will discuss the future opportunities and challenges of creating, trading, selling and investing in residential securities and derivatives.

There will also be homework assignments, a midterm and final exam. The raw cases and homework assignments will be done in teams of three. The homework assignments are designed to deepen students understanding of key concepts and to prepare students for the mid term and final; the cases, to sharpen students’ critical thinking and judgment in applying the concepts in the course to real business situations and to provide students with a practical foundation should they wish to pursue a career in housing or housing finance.

PowerPoints of lectures and reading materials will be posted on CANVAS before class and all classes will be recorded and made available to students on request. One class will be held at Bloomberg headquarters where students will be grouped into teams and given residential real estate securities (Agency MBS and Agency CMOs) to analyze on a Bloomberg to make investment decisions. Some cash flow modeling in Excel will also be done.

All students who would like to understand these huge, critical markets are welcome. The course would be particularly appropriate for students wishing to pursue careers as developers or investors in residential real estate properties (“the dirt”) as well as for MBA, MS, or PhD students wishing to pursue careers in residential real estate finance and/or the trading, creating, investing in, analysis, selling or regulation of residential real estate securities (“the debt and derivatives”).

“The Dirt”

After an introductory overview of the US housing market, its’ history, its’ unique hybrid system of housing finance, and linkages between the housing and capital markets, the first part of the course will focus on the housing markets and housing development, both market priced and affordable housing . What influences the buyers’ purchase decision? What drives house price appreciation and depreciation? How does one entitle land? How does one develop a residential subdivision, urban high-rise condominium, manufactured housing or market rate or affordable rental apartments. What is the process of buying a house or condominium (title and lien searches, property taxes, engineering reports, real estate brokers, environmental evaluations etc., MLS services). Who are the new companies disrupting these old businesses and how are they doing so.

“Debt”

The second section of the course will cover the \$10 trillion US residential real estate financing system (“the debt”). How is a US residential development mortgage underwritten in the absence of sufficient existing collateral, how is an individual residential mortgage underwritten, how are FICO scores and debt to income (DTI) ratios used. What is the best way to value non-income generating real estate assets, such as a house. What are the different types of US residential mortgages (fixed, floating, amortizing, IO, biweekly, reverse mortgages, equity sharing mortgages), how do they work and what are the mathematics behind them. How do banks finance and account for these mortgages on balance sheets in the wake of the 2008 US housing meltdown.

How do banks securitize residential mortgages in both the private and agency (GNMA, FNMA, FHLMC) markets. How do the rating agencies rate private label MBS? What are the roles of the Government Sponsored Enterprises (GSEs), Fannie Mae, Freddie Mac, Ginnie Mae and the \$1 trillion Federal Home Loan Bank System (FHLB)? How do they help finance different types of US housing. What are their strengths? What were their weaknesses that led to their near collapse in 2008 and ways of operation now? How should they be changed to avoid a similar fate in the future. What are Connecticut Avenue securities? Structured Agency Credit Risk (STACRS) securities? Why are they being used and how to value and invest in them. How do bond investors, traders, and chief investment officers analyze, price, hedge, and invest in private and agency mortgage backed securities (MBS)? What are TBA MBS and how are they traded. What will be the impact of the new uniform MBS security that is to replace TBA MBS when it is launched in the summer of 2019 and why was it created. How are mortgage pipelines and servicing managed and hedged. What are the opportunities and risks in these markets? How do we model and forecast residential credit defaults and prepayments? How do mortgage REITs work? What risks and opportunities do they offer and what is their role in the US housing system? How do dollar rolls and repo work to finance residential mortgage backed securities.

“Derivatives”

The final section will cover securities that are derived from US residential mortgage debt and debt securities such as agency and non-agency collateralized mortgage obligations (CMOs). How can we use financial engineering and structuring to change prepayment risk and credit risk to suit investors needs and to increase underwriter profits? What conflicts arise from these two goals and what are the regulations to mitigate these conflicts. What are interest only and principal only securities? PACs, companions, inverse floaters etc. What residential mortgage indices are available (e.g. MBX, IOS, etc.) how can they be used to invest, hedge and arbitrage markets. How do we calculate duration and convexity in securities with embedded call options? How can option adjusted spread analysis be used and what better measures are there in hedging and valuing option embedded MBS.

Finally the course will cover one of largest and most important non-US housing markets. For the fall 2019, the focus will be the Chinese housing and housing finance markets - how they work, current issues and their outlook.

PREREQUISITE: Same as Real Estate Finance, B6300 Corporate Finance and B8306 Capital Markets as a co-requisite.

REQUIRED COURSE MATERIALS

Course Handouts: PowerPoints of lectures, readings, and cases will be available on CANVAS before classes. Students should make sure to read lecture PowerPoint slides and readings BEFORE each class. They may bring their lecture PowerPoint slides with them to class, however PowerPoint slides will be provided at the beginning of each class so that students may take notes on them. The purpose is to encourage students to actively participate in class discussions not note taking. Some class “cold calling” questions will be embedded in these lecture notes. Readings that are optional are indicated. They are provided for students who wish to take a deeper look into a particular topic. They are also helpful additional reference documents to keep should you pursue a career in residential real estate finance. Lectures will be recorded and made available on demand.

CONNECTION TO THE CORE

- Corporate Finance: Time value of money, risk, CAPM, Modigliani Miller Theorem, arbitrage pricing and the law of one price, efficient markets, frictions.
- Managerial Economics: Maximization and thinking on the margin, analyzing complex decision-making under uncertainty, understanding market competition and equilibrium thinking.
- Managerial Statistics: Statistics data analysis, probability intro, conditional probability, modeling uncertainty.
- Global Economic Environment I: What causes inflation, what drives employment, what are the causes of business cycle, what are the effects of monetary policy, what is the role of financial markets in the economy.

CLASSROOM NORMS AND EXPECTATIONS

Students are expected to adhere to CBS Core Culture in this class by being Present, Prepared, and Participating.

Please bring and post name plates in every class. Class participation counts for 10% of your course grade. Please participate. The course is cumulative, so being lost gets quite costly very quickly. TAs will take attendance and note class participation. Excessive unexcused absences from class will weigh more heavily than 10% on your grade. Constructive comments in class will increase the participation points. Please turn off cell phones, laptops, Blackberries, etc. Absences or late arrivals will be considered as a factor in class participation. Materials covered by guest lecturers are required

COURSE ROAD MAP/SCHEDULE²

Session	Topic(s)	Required Pre-Readings	Assignments Due (Type)
1 09/04/2019 (W)	Course Overview and Requirements: Overview of the US housing and housing finance markets; the link between these markets and the 2007 Crash.	Session 1 Lecture notes (CANVAS)	
2 09/9/2019 (M)	Residential Real Estate Price Dynamics: <i>The fundamental determinants of residential real estate prices – interest rates, jobs, taxes, zoning, regulations, environmental factors etc. The recent impact of state and local tax deductibility changes. Methods for measuring real estate price changes; Commonly used residential property price indexes.</i>	Session 2 Lecture Notes Mayer-Hubbard, Housing Prices, Interest Rate and the Mortgage Market Meltdown (CANVAS) Himmelberg, Mayer, Sinai: Assessing High House Prices: Bubbles, Fundamentals and Misperceptions (CANVAS) Case-Shiller Prices of SF Homes... HW #1 (CANVAS) Due 9/23/19	
3 09/11/2019 (W)	Investing in Residential Real Estate <i>Factors influencing the homebuyer purchase decision, mortgage rates, expected appreciation, time horizons etc. Part I</i>	Session 3 Lecture notes. (CANVAS) Readings TBD (CANVAS)	
4 09/16/2019 (M)	Residential Real Estate Development <i>The stages of developing residential real estate properties (housing subdivisions, condominiums, garden apartments, multifamily apartments. Idea conception, feasibility, planning, financing, market analysis, contract negotiation, construction, marketing. Construction financing how it works, differences with stabilized CRE financing.</i>	Session 5 Lecture Notes (CANVAS) Readings TBD (CANVAS) HW #2 (CANVAS) Due Oct 11	
5 09/18/2019 (W)	Residential Construction and Land Finance: <i>Land loans, development, redevelopment and construction loans. How they are underwritten, how this is different from stabilized CRE lending, their characteristics, construction budgets, draw requests, borrower, GC and lender interactions during the development process, cost to completion, take out finance, impact of recent HVCRE regulations.</i>	AIA Pay Application Excel Form, Construction Lending Industry Standard Practices	Case #1 Write-up

²The dates on which various topics are discussed in class may change depending on when speakers can attend.

<p>6 09/23/2019 (M)</p>	<p>Case #1 Discussion: Suburban Subdivision Development</p> <p>Guest Speaker: Adam Rapport, head of acquisitions at Cross Lake Partners (a spinout of Paulson and Partners with a focus on buying distressed subdivisions and one of the largest owners of residential lots in the US) will discuss their experiences, how to develop residential subdivisions as well as the challenges and opportunities involved in the process of entitling land and developing suburban residential subdivisions.</p>	<p>Case #1: Residential subdivision case documents will be posted online (CANVAS)</p>	<p>HW # 1 Real Estate Price Dynamics Due (A: Group).</p>
<p>7 09/25/2019 (W)</p>	<p>Case #2 Discussion: Urban Condominium Development</p> <p>Guest Speaker: Chris Prokop, Founder and President, DDG will discuss the opportunities and challenges of developing and selling two recent condominium developments in Tribeca and in San Francisco.</p>	<p>Case #2: Urban condominium case documents. (CANVAS)</p>	<p>Case #2 Write-up</p>
<p>8 9/30/2019 (M)</p>	<p>Case #3 Discussion: Affordable Housing, Workforce Housing, Low Income housing development.</p> <p>Guest Speaker: Meredith Marshall, co-founder and CEO of BRP Properties and CBS alumnus. Mr. Marshall will discuss the affordable, low income and workforce housing market overall, how it is funded, joint private public financing, programs and partnerships and the challenges and opportunities of developing this type of housing. He will then discuss the opportunities and challenges of developing a specific affordable housing project.</p>	<p>Case #3: Affordable Housing Development Project in Harlem case documents (CANVAS)</p>	<p>Case #3 Write-up</p>
<p>9 10/02/2019 (W)</p>	<p>Home Buying and Equilibrium in the Housing Market <i>Factors influencing the homebuyer purchase decision, mortgage rates, expected appreciation, time horizons etc. Part II</i></p>	<p>Session 4 Lecture Notes (CANVAS) Readings TBD</p>	

<p>10 10/07/2019 (M)</p>	<p>Residential Mortgage Contracts and Mortgage Math: Part I <i>Different types of residential mortgages (Fixed rate, ARMs, Hybrid ARMs, IO, Prime, Alt-A, Limited Doc, No Doc, Sub-Prime, HELOCs, Option ARMs, Reverse Equity Mortgages, Shared Appreciation mortgages. Comparison of US mortgages vs those in other countries. Residential fixed and adjustable rate mortgage math.</i></p>	<p>Session 9 lecture notes (CANVAS) Readings: Excel spreadsheet, Mortgage Math Examples (CANVAS) Optional: ARM Share of Mortgage Market, Moench, Vickery & Aragon (CANVAS);</p>	
<p>11 10/11/2019 (F) Class moved to Friday 10/11@XXX because of Yom Kippur holiday</p>	<p>Residential Mortgage Contracts and Mortgage Math: Part II <i>Different types of residential mortgages (Fixed rate, ARMs, Hybrid ARMs, IO, Prime, Alt-A, Limited Doc, No Doc, Sub-Prime, HELOCs, Option ARMs, Reverse Equity Mortgages, Shared Appreciation mortgages. Comparison of US mortgages vs those in other countries. Residential fixed and adjustable rate mortgage math.</i></p>	<p>Session 10 lecture notes. (CANVAS)</p>	<p>HW #2 Mortgage Math Due (A: Group)</p>
<p>12</p>	<p>Residential Mortgage Risks and Securitization: <i>Interest rate risk, credit/default risk, liquidity risk and prepayment risk; How agency and non-agency residential mortgage securities are created; overcollateralization, excess spread, senior sub structures, CDOs, warehouse lines, reps and warranties</i></p>	<p>Session 11 lecture notes. (CANVAS) Liar's Poker, Ch. 5, 6, 7. (CANVAS)</p>	
<p>13 10/23/2019 (W)</p>	<p>Understanding Residential Mortgage Prepayments <i>Mortgage and embedded call and put options; contraction/extension risk; economic and non-economic determinants of prepayments, burnout; G-fees, The Fed and the Experience of QE3.</i></p>	<p>Session 13: Lecture Notes (CANVAS) HW #3 Prepayments due 10/30/19</p>	
<p>14 Midterm Exam (Monday, 10/28/2019)</p>			
<p>15 10/30/2019 (W)</p>	<p>Default and Prepayment Modeling Guest Speaker: Andrew Davidson, Founder and President of Andrew Davidson and Co. will discuss the opportunities and challenges of modeling residential prepayments</p>	<p>Session 14 Lecture Notes (CANVAS)</p>	<p>HW #3 Prepayments Due (A: Group)</p>

	and defaults as well as the “theory and reality “of building successful residential prepayment and default models and how they can be used to make money.		
16 11/6/2019 (W)	The US Residential Mortgage Finance System: <i>How the complex hybrid US residential mortgage finance system works including balance sheet lenders, private sector and Government Sponsored Enterprises securitizations (Fannie Mae, Freddie Mac, Ginnie Mae, Federal Home Loan Bank System) and mortgage REITs.</i>	Session 15 Lecture Notes (CANVAS) Readings: The Role of Securitization in Mortgage Lending, Federal Reserve Bank of Chicago. (CANVAS)	
17 11/11/2019 (M)	MBS Valuation, and Trading <i>Weighted average life spreads, yields, Z-spreads, OAS, beyond OAS, effective duration, effective convexity; dollar rolls, hedging mortgage pipeline risk.</i>	Session 16 Lecture Notes (CANVAS) Readings: Price of Risk Constant: Going Beyond OAS, Cohler, Feldman and Lancaster, Journal of Fixed Income (CANVAS) HW #4 due 11/20/19	
18 11/13/2019 (W)	Collateralized Mortgage Obligations (CMOs) <i>Carving cash flows into bonds incl.: sequential pay, planned amortization class, targeted amortization class, floaters and inverse floaters, companion bonds, Splitting the atom - IOs and POs.Conflicts of interest</i>	Session 18 Lecture Notes (CANVAS)	
19 11/18/2019 (M)	The Future of US Housing Finance Guest Speaker: Hugh Frater, CEO, Federal National Mortgage Corporation, will discuss pre and post-crash changes at the GSEs, as well the outlook for the US housing finance and alternative roles for the GSEs such as Freddie Mac in this new world.		
20 11/20/2019 (W)	Non-Agency Mortgage Backed Securities <i>Credit and prepayment tranching: role in the sub-prime crisis, path to the future?</i>	Session 19 Lecture Notes (CANVAS)	HW #4 Relative Value Measures, YTM, Z spreads, OAS, Agency CMOs, Non-Agency CMOs, Due. (A: Group); Mortgage REITs.

<p>21 11/25/2019 (M)</p>	<p>The Business of Creating, Valuing and Trading Agency MBS, Agency CMOs, Non-Agency CMOs. The impact of and outlook for the new Uniform Mortgage Backed Securities (to be implemented June 3, 2019) which will replace Agency TBA MBS</p> <p>Guest speaker: Scott Eichel, Head of Securitized Products and Markets, Barclays</p>		
<p>22 12/02/2019 (M)</p>	<p>Bloomberg Session: <i>Case #4: Analysis of an Agency MBS and CMO deal on Bloomberg terminals at Bloomberg Headquarters. (Off site class.)</i></p>	<p>Case 4 Agency MBS and CMO documents (CANVAS) Case 4 will be worked on at Bloomberg Headquarters</p>	
<p>23 12/4/2019 (W)</p>	<p>Non-US Housing Markets: Chinese Housing Markets and Finance. Demographic and other factors shaping supply and demand; is there a bubble in Chinese housing; all housing is local regional differences in China; Chinese public and private housing finance. The importance of the housing markets to the economy, politics and social stability of China. Outlook for housing</p> <p>Guest Speaker: Dr. Chenyang (Jason) Wei, SMD, Zenity Holdings (\$70B Chinese RE Assets), Prof. of Practice, Tsinghua University</p>	<p>Reading: Overview of China's Housing Markets (CANVAS)</p>	
<p>24 Final Exam (Monday, 12/9/2019)</p>			

METHOD OF EVALUATION

Class Participation	10%
Cases (4)	25%
Homework Exercises (4)	20%
Midterm & Final Exam	45%

- **Assignments:** There will be homework assignments and cases. Homework assignments and cases will be completed in groups up to a maximum of 3 students. It is your responsibility to form the group. Assignments should be turned in at the beginning of class on the day it is due. Late assignments will not be accepted.
- **Midterm:** The midterm exam covers material for the first half of the term. It is only offered in class. Make-ups are not given unless you have written authorization from the Office of Student Affairs (OSA).
- **Final Exam:** The final exam covers material primarily from the lectures after the 1st midterm. Some material from the first half of the class may also be included. It is only offered in class. Make-ups are not given, unless you have written authorization from the Office of Student Affairs (OSA).
- **Students must be prepared to discuss the “raw cases” led by guest speakers in class and and turn in a one page write-up that will be graded and taken into consideration in the case course grade.**

The readings distributed over the semester are to help you better understand concepts and materials covered in class. Materials only in the readings but not covered in class are not required for the exams.

ASSIGNMENTS

All of your assignment submissions are subject to the [CBS Honor Code](#). Violations of the CBS Honor Code may lead to failing the assignment, failing the course, suspension, and/or dismissal. In order to avoid ambiguity that may lead to unintentional violations of the Honor Code, assignment description types have been standardized and specified below.

<u>Type</u>	<u>Designation</u>	<u>Grade</u>	<u>Preparation of submission</u>	<u>Discussion of Submission*</u>	<u>Discussion of Concepts**</u>
A	Group Work	Same grade for all group members	By the group	Permitted to discuss (within group)	Permitted
B ¹	Individual w/ Discussions of Concepts and Submission	Individual grade	Individual preparation	Permitted to discuss; sharing solutions or submission files is not allowed	Permitted
B ²	Individual w/ Discussions of Concepts Only	Individual grade	Individual preparation	Not permitted to share/discuss solutions or submission	Permitted
C	Individual	Individual grade	Individual preparation	Not permitted to share/discuss solutions or submission	Not permitted***

* The designated group can be either an assigned study group or a self-selected one.

ATTENDANCE POLICY

Students are required to attend each class. Students should reach out to the [Office of Student Affairs \(OSA\)](#) by using Core Absence Form on this course’s Canvas page regarding excused absences (for religious observances; personal,

medical, and family emergencies; military service; court appearances such as jury duty). Unexcused absences will affect your course grade.

NOTE: The following is applicable for Core Courses:

- Students that miss more than **33%** of their classes (unexcused absences) will at most receive a **P for the course grade**
- Students that miss more than **50%** of their classes (unexcused absences) will receive a **F for the course grade**

NOTE: The following is applicable for Core Courses and for any electives with OSA-administered exams:

- Students that miss the exam for an **excused** reason but are unable to take the exam within the stated make-up period will receive a **zero for the final exam grade**
- Students that miss the exam without notifying OSA (**unexcused**), will receive an **F for the course grade**

Taking exams off schedule creates significant logistical challenges in finding rooms and proctors and most importantly, has the potential to jeopardize the integrity of the exam. Therefore, requests for rescheduling of exams should only be made within the first three weeks of the semester and only for serious conflicts.

Rescheduling of exams for weddings, early travel home are not acceptable. Last minute rescheduling of exams may only be done for very serious cause.

INCLUSION, ACCOMMODATIONS, AND SUPPORT FOR STUDENTS

At Columbia Business School, we believe that diversity strengthens any community or business model and brings it greater success. Columbia Business School is committed to providing all students with the equal opportunity to thrive in the classroom by providing a learning, living, and working environment free from discrimination, harassment, and bias on the basis of gender, sexual orientation, race, ethnicity, socioeconomic status, or ability.

Columbia Business School will make reasonable accommodations for persons with documented disabilities. Students are encouraged to contact the Columbia University's Office of Disability Services for information about registration. Students seeking accommodation in the classroom may obtain information on the services offered by Columbia University's Office of Disability Services online at www.health.columbia.edu/docs/services/ods/index.html or by contacting (212) 854-2388.

Columbia Business School is committed to maintaining a safe environment for students, staff and faculty. Because of this commitment and because of federal and state regulations, we must advise you that if you tell any of your instructors about sexual harassment or gender-based misconduct involving a member of the campus community, your instructor is required to report this information to a Title IX Coordinator. They will treat this information as private, but will need to follow up with you and possibly look into the matter. Counseling and Psychological Services, the Office of the University Chaplain, and the Ombuds Office for Gender-Based Misconduct are confidential resources available for students, staff and faculty. "Gender-based misconduct" includes sexual assault, stalking, sexual harassment, dating violence, domestic violence, sexual exploitation, and gender-based harassment. For more information, see <http://sexualrespect.columbia.edu/gender-based-misconduct-policy-students>.

PROFESSOR'S BIOGRAPHY

Professor Lancaster has over twenty five years of professional experience in real estate finance and capital markets including President, The Minot Group (real estate finance and capital markets consulting to hedge funds, private equity, REITs, banks and insurance companies); Co-head Financial Analytics and Structured Transactions, RBS; Chief Investment Officer, Real Estate Division, Wachovia/Wells Fargo; Head of Commercial Real Estate Research, Wachovia Capital Markets; Head of Structured Products Research, Wachovia Capital Markets; Managing Director Principal Bear Stearns (commercial and residential real estate securities); Senior Capital Markets Economist Federal Reserve Bank of NY and Bank of England.

He also invests in real estate development projects in New York, real estate private equity in Asia, mezzanine and bridge funds and is currently a partner developing condominiums in Tribeca. His passion for real estate started with his work on the redevelopment of Boston's waterfront as a sophomore at MIT .

He is a full time professor in the MBA program at the Columbia Business School and was formerly an adjunct professor at the Columbia Business School and the Stern School of Business, New York University.

He holds a BSc in Economics from the Massachusetts Institute of Technology, an MBA in Finance, Stern School of Business, New York University, and a Master of International Affairs and Public Policy, Columbia University.

He is a former board member of the Commercial Real Estate Finance Association, a former Executive Committee member of the Mortgage Bankers Association and Editor in Chief of Commercial Real Estate Finance journal. He periodically lectures at Duke University and the Wharton School of Business, University of Pennsylvania.