

B9327-001 Empirical Asset Pricing II
Fall 2022
Course Outline and Syllabus

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Contact Information:

Professor Stijn Van Nieuwerburgh

Kravis Hall, office 796

Email: svnieuwe@gsb.columbia.edu

Office Hours: Before or after class. Otherwise, please email me for an appointment.

Administrative Assistant: Christina Izzo, ci2235@gsb.columbia.edu

Teaching Assistant: Neel Shah, NShah22@gsb.columbia.edu

Schedule

The class takes place on Mondays from 2-5.15pm. The first class is on September 12. There is no class on October 17 and on November 7. The last class is on December 12. The classroom is **Kravis XX**.

Description

The course provides a robust discussion of recent research in empirical asset pricing. The course format will be lectures with student Q&A. The goal is to connect empirical methods to theoretical concepts, and ultimately to create ideas for independent research in asset pricing.

Prerequisites

The course is designed for PhD and MS students in finance. The suggested prerequisites are Econometrics, Financial Econometrics or Time Series Analysis, Finance Theory I. You may take the course without all these prerequisites at your own peril. At least one PhD-level finance course on asset pricing and one PhD-level course on statistics or econometrics is required. Students are also encouraged to take “Asset Pricing: Theory and Evidence” (in CBS finance) or “Macro Finance” (in the CU economics department) concurrently or before this course. This course is designed to have minimal overlap with the preceding courses.

Requirements

There are three requirements for this course. The first is that you participate in class. You are expected to read through the class material and required papers before class. The goal is to spend a fair amount of time discussing the research in interactive format. This requires investing the time to read the material and come with a list of Q&A. Attendance is not participation. Participation accounts for 20% of your grade.

The second requirement is that you complete 6 problem sets. It is hard to learn empirical asset pricing without doing empirical asset pricing. So, the problem sets are exercises to get you started. You may work in groups of up to 3 people, but everyone must hand in their individual copy. Each problem set counts for 5% of the grade, for a total of 30%. Problem sets are due before the start of class the week after the lecture to which they pertain. For example, the file “PS_EAP_week3.pdf” covers the material in week 3 and is due before the start of lecture/week 4.

The third requirement is that you write a term paper. The minimum requirement for the paper is that you survey one of the areas covered in this class in more depth, assess what the contributions of the papers are, discuss their strengths and weaknesses, and propose how they could be extended or improved. A better paper would replicate and extend one of the papers we read, which is a great way to start a research project. The best papers would explore de novo research ideas in empirical asset pricing, possibly drawing new connections between the topics we covered. The **due date** for the paper is **Friday December 16, no exceptions**. The term paper accounts for 50% of your grade.

Materials

Articles and lecture notes that we will be covering will be available on Canvas. If you want to work in this area, you will need to develop a working knowledge of Matlab and/or Python.

Excellent reference books are the following:

Cochrane, John, 2005, *Asset Pricing: Revised Edition* Princeton, NJ: Princeton University Press

Campbell, John Y., 2018, *Financial Decisions and Markets: A Course in Asset Pricing*, Princeton, NJ: Princeton University Press

Campbell, John Y., Andrew W. Lo, and A. Craig MacKinlay, 1997, *The Econometrics of Financial Markets*, Princeton, NJ: Princeton University Press

Duffie, Darrell, 2001, *Dynamic Asset Pricing Theory*, 3rd Edition, Princeton, NJ: Princeton University Press

Singleton, Kenneth J., 2006, *Empirical Dynamic Asset Pricing*, Princeton, NJ: Princeton University Press

Hamilton, James D., 1994, *Time Series Analysis*, Princeton, NJ: Princeton University Press

John Campbell also provides an interesting review of research ideas in his survey of the 2013 Nobel Prize winners research: Campbell, John Y., 2014, Empirical asset pricing: Eugene Fama, Lars Peter Hansen, and Robert Shiller, *Scandinavian Journal of Economics* 116, pp.593-634.

The reading list below cites the papers we will discuss, some in more detail than others, and a few are there for your own reference only. The key papers which I would like you to **read before class** are indicated with a **star**.

Detailed Course Overview

Week 1 –September 12

Topic: Equity Return Predictability: The Role of Cash Flows and Discount Rates

Belo, Frederico, Pierre Collin-Dufresne, and Robert S. Goldstein, 2015, Dividend dynamics and the term structure of dividend strips, *Journal of Finance* 70, 1115-1160.

Backus, David, Nina Boyarchenko, and Mikhail Chernov, 2018, Term structures of asset prices and returns, *Journal of Financial Economics* 129, 1-23.

van Binsbergen, Jules H. and Ralph S.J. Koijen, 2010, Predictive regressions: A present-value approach, *Journal of Finance* 65, 1439–1471.

van Binsbergen, Jules H., Michael W. Brandt, and Ralph S.J. Koijen, 2012, On the timing and pricing of dividends, *American Economic Review* 102, 1596–1618.

van Binsbergen, Jules H., Wouter Hueskes, Ralph S.J. Koijen, and Evert Vrugt, 2012, Equity Yields, *Journal of Financial Economics* 110, 503-519.

van Binsbergen, Jules H. and Ralph S.J. Koijen, 2017, The term structure of returns: Facts and theory, *Journal of Financial Economics* 124, 1-21.

*Cochrane, John H., 2011, Presidential Address: Discount Rates, *Journal of Finance* 66, 1047-1108.

Croce, Massimiliano, Martin Lettau, and Sydney Ludvigson, 2015, Investor information, long-run risk, and the term structure of equity, *Review of Financial Studies* 28, 706-742.

Gormsen, Nils and Ralph S.J. Koijen, 2020, Coronavirus: Impact on Stock Prices and Growth Expectations, *Review of Asset Pricing Studies* 10, 574-597.

Gupta, Arpit and Stijn Van Nieuwerburgh, 2021, Valuing Private Equity Strip by Strip, *Journal of Finance* 76, 3255-3307.

Kelly, Bryan, and Seth Pruitt, 2013, Market expectations in the cross section of present values, *Journal of Finance* 68, 1721-1756.

*Koijen, Ralph and Stijn Van Nieuwerburgh, 2011, Predictability of Stock Returns and Cash Flows, *Annual Review of Financial Economics* 3, 467-491.

Lettau, Martin and Stijn Van Nieuwerburgh, 2008, Reconciling the Return Predictability Evidence, *Review of Financial Studies* 21, 1607-1652

Weber, Michael, 2018, Cash Flow Duration and the Term Structure of Equity Returns, *Journal of Financial Economics* 128, 486-503.

Week 2 – September 19

Topic: The Cross-Section of Stock Returns and the Factor Zoo

Bryzgalova, Svetlana, 2016, Spurious factors in linear asset pricing models, Working Paper London Business School.

Daniel, Kent, Lira Mota, Tano Santos, Simon Rottke, 2020, The Cross-Section of Risk and Return, Review of Financial Studies, 33, 1927-1979.

Feng, Guanhao, Stefano Giglio, and Dacheng Xio, 2020, Taming the Factor Zoo, Journal of Finance, 75, 1327-1370.

Frazzini, Andrea and Lasse H. Pedersen, 2014, Betting against beta, Journal of Financial Economics 111, 1-25.

Freyberger, Joachim, Andreas Neuhierl, and Michael Weber, 2020, Dissecting Characteristics Nonparametrically, Review of Financial Studies, 33, 2326-2377.

*Gu, Shihao, Bryan Kelly, and Dacheng Xiu, 2020, Empirical Asset Pricing via Machine Learning, Review of Financial Studies, 33, 2223-2273

*Harvey, Campbell, Yan Liu, and Heqing Zhu, 2016, ... and the Cross-Section of Expected Returns, Review of Financial Studies 29, 5-68.

Hou, Kewei, Chen Xue, and Lu Zhang, 2020, Replicating anomalies, Review of Financial Studies, 33, 2019-2133.

Israel, Ronen and Tobias Moskowitz, 2013, The role of shorting, firm size, and time on market anomalies, Journal of Financial Economics 108, 275-301.

*Karolyi, Andrew and Stijn Van Nieuwerburgh, 2020, New Methods for the Cross-Section of Returns, Review of Financial Studies, 33, 1879-1890.

Kozak, Serhiy, Stefan Nagel, and Shrihari Santosh, 2020, Shrinking the Cross Section, Journal of Financial Economics, 135, 271-292.

Lettau, Martin and Markus Pelger, 2018, Factors that fit the time series and cross-section of stock returns, Review of Financial Studies, 33, 2274-2325.

Week 3 – September 26

Topic: Intermediary-based Asset Pricing

*Adrian, Tobias, Erkki Etula, and Tyler Muir, 2014, Financial intermediaries and the cross section of asset returns, *Journal of Finance* 69, 2557-2596.

Adrian, Tobias and Hyun Song Shin, 2013, Procyclical Leverage and Value-at-Risk, *Review of Financial Studies* 27, 373-403.

Brunnermeier, Marcus and Lasse H. Pedersen, 2009, Market liquidity and funding liquidity, *The Review of Financial Studies* 22, 2201-2238.

Brunnermeier, Marcus and Yuliy Sannikov, 2014, A Macroeconomic Model with a Financial Sector, *American Economic Review* 104, 379-421.

Elenev, Vadim, Tim Landvoigt, and Stijn Van Nieuwerburgh, 2016, Phasing Out the GSEs, *Journal of Monetary Economics* 81, 111-132.

*Elenev, Vadim, Tim Landvoigt, and Stijn Van Nieuwerburgh, 2021, A Macroeconomic Model of Financially Constrained Intermediaries and Producers, *Econometrica* 89, 1361-1418.

Greenwald, Landvoigt, and Van Nieuwerburgh, 2021, Financial Fragility with SAM?, *Journal of Finance* 76, 651-706

*He, Zhiguo, Brian Kelly, and Asaf Manela, 2017, Intermediary asset pricing: New evidence from many asset classes, *Journal of Financial Economics* 126, 1-35.

He, Zhiguo and Arvind Krishnamurty, 2013, Intermediary Asset Pricing, *American Economic Review* 103, 732–770.

Malloy, Christopher, Tobias Moskowitz, and Annette Vissing-Jorgensen, 2009, Long-run Stockholder Consumption Risk and Asset Returns, *Journal of Finance* 64, 2427-2479.

Santos, Tano and Pietro Veronesi, 2017, Habits and Leverage, Working Paper Columbia University

Week 4 – October 3

Topic: Production-based Asset Pricing Models

Bazdresch, Santiago, Frederico Belo, and Xiaoji Lin, 2014, Labor Hiring, Investment and Stock Return Predictability in the Cross Section, *Journal of Political Economy* 122, 129-177.

Cochrane, 1991, Production-Based Asset Pricing and the Link Between Stock Returns and Economic Fluctuations, *Journal of Finance* 46, 209-237.

Delikouras, Stefanos and Robert Dittmar, 2021, Does the Investment-based Model Explain Equity Returns? Evidence from Euler Equations. Working Paper University of Miami.

Gonçalves, Andrei S., Chen Xue, and Lu Zhang, 2020, Aggregation, Capital Heterogeneity, and the Investment CAPM, *The Review of Financial Studies* 33, 2728–2771.

*Hou, Kewei, Chen Xue, and Lu Zhang, 2015, Digesting anomalies: An investment approach, *Review of Financial Studies* 28, 650-705.

Kaltenbrunner, Georg and Lars Lochstoer, 2010, Long-Run Risk through Consumption Smoothing, *Review of Financial Studies* 23, 3141 – 3189.

Kogan, Leonid, Dimitris Papanikolaou, Amit Seru, and Noah Stoffman, 2017, Technological Innovation, Resource Allocation and Growth, *Quarterly Journal of Economics* 132 665-712.

Kogan, Leonid, Dimitris Papanikolaou, and Noah Stoffman, 2020, Left Behind: Creative Destruction, Inequality, and the Stock Market, *Journal of Political Economy*, 128, 855-906

*Liu, Laura, Toni Whited, and Lu Zhang, 2009, Investment-based Expected Stock Returns, *Journal of Political Economy*, 117, 1105-1139.

*Papanikolaou, Dimitris, 2011, Investment Shocks and Asset Prices, *Journal of Political Economy* 119, 639-685.

*Zhang, Lu, 2005, The value premium, *Journal of Finance* 60, 67-103.

Week 5 – October 10

Topic: Asset Pricing via Demand Systems

Chang, Yen-Cheng, Harrison Hong, and Inessa Liskovich, 2014, Regression Discontinuity and the Price Effects of Stock Market Indexing, *Review of Financial Studies*, 28, 212-246.

Joshua Coval and Erik Stafford, 2007, Asset Fire Sales in Equity Markets, *Journal of Financial Economics*, 86, 479-512.

Koijen, Ralph and Xavier Gabaix, Granular Instrumental Variables, 2020, Working Paper.

Koijen, Ralph and Xavier Gabaix, In Search of the Origins of Financial Fluctuations: The Inelastic Markets Hypothesis, 2021, Working Paper.

Koijen, Ralph, Francois Koulischer, Benoit Nguyen, and Motohiro Yogo, 2021, Inspecting the Mechanism of Quantitative Easing in the Euro Area, *Journal of Financial Economics* 140, 1-20.

*Koijen, Ralph, Robert Richmond, and Motohiro Yogo, 2021, Which Investors Matter for Equity Valuations and Expected Returns? Working Paper

*Koijen, Ralph and Motohiro Yogo, 2019, A Demand System Approach to Asset Pricing, *Journal of Political Economy*, 127, 1475-1515

*Koijen, Ralph and Motohiro Yogo, 2020, Exchange Rates and Asset Prices in a Global Demand System, Working Paper.

*Pastor, Lubos, Robert F. Stambaugh, and Lucian A. Taylor, 2015, Scale and skill in active management, *Journal of Financial Economics* 116, 23-45.

*Berk, Jonathan, and Jules H. van Binsbergen, 2015, Measuring skill in the mutual fund industry, *Journal of Financial Economics* 118, 1-20.

Berk, Jonathan, and Jules H. van Binsbergen, 2015, Assessing asset pricing models using revealed preference, *Journal of Financial Economics* 119, 1-23.

Ibert, Markus, Ron Kaniel, Stijn Van Nieuwerburgh, and Roine Vestman, 2017, Are Mutual Fund Managers Paid for Investment Skill? , *Review of Financial Studies* 31, 715-772.

Kacperczyk, Marcin, Stijn Van Nieuwerburgh, and Laura Veldkamp, 2014, Time-Varying Fund Manager Skill, *Journal of Finance* 69, 1455-1484.

*Kacperczyk, Marcin, Stijn Van Nieuwerburgh, and Laura Veldkamp, 2016, Rational Attention Allocation over the Business Cycle, *Econometrica* 84, 571-626.

Kaniel, Ron, Zihan Lin, Markus Pelger, and Stijn Van Nieuwerburgh, 2022, Machine Learning the Skill of Mutual Fund Managers, Working Paper Columbia Business School

Koijen, Ralph, 2014, The Cross-section of Managerial Ability, Incentives, and Risk Preferences *Journal of Finance* 69, 1051-1098.

Lan, Yingcong, Neng Wang, and Jinqiang Yang, 2013, The economics of hedge funds, *Journal of Financial Economics* 110, 300-323.

Pastor, Lubos and Robert F. Stambaugh, 2012, On the size of the active management industry, *Journal of Political Economy*, 740–781.

Bekaert, Geert, and Marie Hoerova, 2014, The VIX, the variance premium, and stock market volatility, *Journal of Econometrics* 183, 181-192.

Chen, Ing-haw, 2019, The VIX Premium, *Review of Financial Studies* 32, 180-227.

Choi, Hoyong, Philippe Mueller, and Andrea Vedolin, 2017, Bond Variance Risk Premiums, *Review of Finance* 21, 987-1022.

*Dew-Becker, Ian, Stefano Giglio, Anh Le, and Marius Rodriguez, 2017, The Price of Variance Risk, *Journal of Financial Economics* 123, 225-250.

*Drechsler, Itamar and Amir Yaron, 2011, What's vol got to do with it? *Review of Financial Studies* 24, 1–45.

Drechsler, Itamar, 2013, Uncertainty, time-varying fear, and asset prices, *Journal of Finance* 63, 1843-89.

Giglio, Stefano and Bryan Kelly, 2018, Excess volatility: Beyond discount rates, *Quarterly Journal of Economics* 133, 71-127.

*Herskovic, Bernard, Bryan T. Kelly, Hanno Lustig, and Stijn Van Nieuwerburgh, 2016, The common factor in idiosyncratic volatility: Quantitative asset pricing implications, *Journal of Financial Economics* 119, 249-283.

Segal, Gill, Ivan Shaliastovich, and Amir Yaron, 2015, Good and bad uncertainty: Macroeconomic and financial market implications, *Journal of Financial Economics* 117, 369-397.

Bansal, Ravi, and Ivan Shaliastovich, 2013, A long-run risks explanation of predictability puzzles in bond and currency markets, *Review of Financial Studies* 26, 1-33.

Bauer, Michael and James Hamilton, 2017, Robust Bond Risk Premia, *Review of Financial Studies* 31, 399-448

Bekaert, Geert, Eric Engstrom, and Andrey Ermolov, 2019, Macro risks and the term structure of interest rates, Working Paper.

Campbell John Y, Sunderam Adi, Viceira Luis, 2017, Inflation Bets or Deflation Hedges? The Changing Risks of Nominal Bonds. *Critical Finance Review* 6, 263-301.

*Cieslak, Anna and Pavol Povala, 2015, Expected Returns in Treasury Bonds, *The Review of Financial Studies* 28, 2859-2901.

Cochrane, John H., and Monika Piazzesi, 2005, Bond Risk Premia, *American Economic Review* 95, 138-160.

Joslin, Scott, Marcel Pribsch, and Kenneth J. Singleton, 2014, Risk premiums in dynamic term structure models with unspanned macro risks, *Journal of Finance* 69, 1197–1233.

Koijen, Ralph S.J., Hanno Lustig, and Stijn Van Nieuwerburgh, 2017, The cross-section and time-series of stock and bond returns, *Journal of Monetary Economics* 88, 50-69.

*Ludvigson, Sydney and Serena Ng, 2009, Macro Factors in Bond Risk Premia, *The Review of Financial Studies* 22, 5027-5067

Song, Dongho, 2017, Bond Market Exposures to Macroeconomic and Monetary Policy Risks, *Review of Financial Studies* 30, 2761-2817

Capponi, Agostino, Allen Cheng, Stefano Giglio, and Richard Haynes, 2017, The Collateral Rule: An Empirical Analysis of the CDS Market, Working Paper.

Chen, Long, Pierre Collin-Dufresne, and Robert Goldstein, 2009, On the Relation Between the Credit Spread Puzzle and the Equity Premium Puzzle, *The Review of Financial Studies* 22, 3367–3409.

Chordia, Tarun, Amit Goyal, Yoshio Nozawa, Avanidhar Subrahmanyam, Qing Tong, 2017, Are Capital Market Anomalies Common to Equity and Corporate Bond Markets? *Journal of Financial and Quantitative Analysis* 52, 1301-1342.

Culp, Christopher, Yoshio Nozawa, and Pietro Veronesi, 2018, Option-Based Credit Spreads, *American Economic Review* 108, 454-488.

*Gilchrist, Simon and Egon Zakrajšek, 2012, Credit Spreads and Business Cycle Fluctuations, *American Economic Review* 102, 1692-1720.

*Greenwood, Robin and Samuel Hanson, 2013, Issuer Quality and Corporate Bond Returns, *Review of Financial Studies* 26, 1483-1525.

Nozawa, Yoshio, 2017, What Drives the Cross-Section of Credit Spreads? A Variance Decomposition Approach, *Journal of Finance* 72, 2045-2072.

Bansal, Ravi, and Ivan Shaliastovich, 2013, A long-run risks explanation of predictability puzzles in bond and currency markets, *Review of Financial Studies* 26, 1-33.

Colacito, Riccardo, Massimiliano Croce, F. Gavazzoni, and Robert Ready, 2018, Currency Risk Factors in a Recursive Multi-Country Economy, *Journal of Finance* 73, 2719-2756

Dahlquist, Magnus and Henrik Hasseltoft, 2019, Economic Momentum and Currency Returns, Working Paper.

Daniel, Kent, Robert J. Hodrick, and Zhongjin Lu, 2017, The carry trade: Risks and drawdowns, *Critical Finance Review* 6, 211-262.

Della Corte, Pasquale, Steven J. Riddiough, and Lucio Sarno, 2016, Currency premia and global imbalances, *Review of Financial Studies* 29, 2161-2193.

*Du, Wenxin, Alexander Tepper, and Adrien Verdelhan, 2018, Deviations from Covered Interest Rate Parity. *Journal of Finance* 73, 915-957.

Jurek, Jakub W., 2014, Crash-neutral currency carry trades, *Journal of Financial Economics* 113, 325-347.

Lettau, Martin, Matteo Maggiori, and Michael Weber, 2014, Conditional risk premia in currency and other asset classes, *Journal of Financial Economics* 114, 197-225.

*Lustig, Hanno, Nikolai Roussanov, and Adrien Verdelhan, 2014, Countercyclical currency risk premia, *Journal of Financial Economics* 111, 527-553.

Lustig, Hanno, Nikolai Roussanov, and Adrien Verdelhan, 2011, Common risk factors in currency markets, *Review of Financial Studies* 24, 3731-3777.

Koijen, Ralph S.J., Tobias J. Moskowitz, Lasse Heje Pedersen, and Evert B. Vrugt, 2018, Carry, *Journal of Financial Economics* 127, 197-225.

Maggiori, Matteo, Brent Neiman, and Jesse Schreger, 2020, International Currencies and Capital Allocation, *Journal of Political Economy* 128, 2019-2066.

Menkhoff, Lukas, Lucio Sarno, Maik Schmeling, and Andreas Schrimpf, 2012, Carry trades and global FX volatility, *Journal of Finance* 67, 681-718.

Acharya, Viral, Lars Lochstoer and Tarun Ramadorai, 2013, Limits to Arbitrage and Hedging: Evidence from Commodity Markets, *Journal of Financial Economics* 109, 441-465.

Cheng, Ing-haw and Wei Xiong, 2014, The Financialization of Commodity Markets, *Annual Review of Financial Economics* 6, 419-441.

Erb, Claude and Campbell Harvey, 2006, The Strategic and Tactical Value of Commodity Futures, *Financial Analyst Journal* 62, 69-97

*Gorton, Gary, Fumio Hayashi and Geert Rouwenhorst, 2012, The Fundamentals of Commodity Futures Returns, *Review of Finance* 17, 35-105

Harrison Hong and Motohiro Yogo, 2012, What does futures market interest tell us about the macroeconomy and asset prices? *Journal of Financial Economics* 105, 473-490

Killian, Lutz, 2009, Not All Oil Price Shocks Are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market, *American Economic Review* 99, 1053-1069

*Kojen, Ralph S.J., Tobias J. Moskowitz, Lasse Heje Pedersen, and Evert B. Vrugt, 2018, Carry, *Journal of Financial Economics* 127, 197-225.

Ready, Robert, Nick Roussanov, and Colin Ward, 2017, Commodity Trade and the Carry Trade: A Tale of Two Countries, *Journal of Finance* 72, 2629-2684

Yang, Fan, 2013, Investment shocks and the commodity basis spread, *Journal of Financial Economics* 110, 164-184

*Boyarchenko Nina, Andreas Fuster, and David Lucca, 2019, Understanding Mortgage Spreads, Review of Financial Studies 32, 3799-3850.

Chernov, Mikhail, Brett Dunn, and Francis Longstaff, 2018, Macroeconomic-Driven Prepayment Risk and the Valuation of Mortgage-Backed Securities, Review of Financial Studies 31, 1132–1183.

Diep, Peter, Andrea Eisfeldt, and Scott Richardson, 2021, The Cross-Section of MBS Returns, Journal of Finance 76, 2093-2151.

Gabaix, Xavier, Arvind Krishnamurty and Olivier Vigneron, 2007, Limits of Arbitrage: Theory and Evidence from the Mortgage-Backed Securities Market, Journal of Finance 62, 557-596.

Giaconelli, Marco, 2021, Idiosyncratic Risk in Housing Markets, Review of Financial Studies 34, 3695-3741.

*Giglio, Stefano, Matteo Maggiori, and Johannes Stroebe, 2015, Very Long-Run Discount Rates, Quarterly Journal of Economics 130, 1-53.

Giglio, Stefano, Matteo Maggiori, and Johannes Stroebe, 2021, Climate Change and Long-Run Discount Rates: Evidence from Real Estate, Review of Financial Studies 34, 3527-3571

Favilukis, Jack and Stijn Van Nieuwerburgh, 2021, Out-of-town Home Buyers and City Welfare, Journal of Finance 76, 2577-2638.

Favilukis, Jack, Pierre Mabille and Stijn Van Nieuwerburgh, 2022, Affordable Housing and City Welfare, Review of Economic Studies forthc.

Malkhozov, Aytek, Philippe Mueller, Andrea Vedolin, and Gyuri Venter, 2016, Mortgage risk and the yield curve. Review of Financial Studies 29, 1220–1253.

Sagi, Jacob, 2021, Asset-Level Risk and Return in Real Estate Investments, Review of Financial Studies 34, 3647-3694.

*Goetzmann, William, Christopher Spaenjers and Stijn Van Nieuwerburgh, 2021, Real and Private Value Assets, Review of Financial Studies 34, 3497-3526.