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ACADEMIC APPOINTMENTS

University of Maryland, Robert H. Smith School of Business <i>Assistant Professor of Finance</i>	2019 – present
University of Michigan, Ross School of Business <i>Assistant Professor of Finance</i>	2013 – 2019

EDUCATION

University of Chicago, Booth School of Business and Dept. of Economics <i>Ph.D. in Financial Economics, M.B.A.</i>	2008 – 2013
CERGE-EI, Charles University, Prague, Czech Republic <i>M.A. in Economics</i>	2006 – 2008
Lviv National University, Lviv, Ukraine <i>B.Sc., M.Sc. in Applied Mathematics and Computer Science</i>	2000 – 2005

RESEARCH INTERESTS

Empirical and theoretical asset pricing, machine learning, deep learning

PUBLICATIONS

[Interpreting Factor Models](#) (with Stefan Nagel and Shrihari Santosh)

Journal of Finance, June 2018, 73(3), 1183-1223.

Abstract: We argue that tests of reduced-form factor models and horse races between “characteristics” and “covariances” cannot discriminate between alternative models of investor beliefs. Since asset returns have substantial commonality, absence of near-arbitrage opportunities implies that the SDF can be represented as a function of a few dominant sources of return variation. As long as some arbitrageurs are present, this conclusion applies even in an economy in which all cross-sectional variation in expected returns is caused by sentiment. Sentiment-investor demand results in substantial mispricing only if arbitrageurs are exposed to factor risk when taking the other side of these trades.

[Shrinking the Cross Section](#) (with Stefan Nagel and Shrihari Santosh)

Journal of Financial Economics, February 2020, 135(2), 271-292, **Lead Article**.

Abstract: We construct a robust stochastic discount factor (SDF) summarizing the joint explanatory power of a large number of cross-sectional stock return predictors. Our method achieves robust out-of-sample performance in this high-dimensional setting by imposing an economically motivated prior on SDF coefficients that shrinks contributions of low-variance principal components of the candidate characteristics-based factors. We find that characteristics-sparse SDFs formed from a few such factors—e.g., the four- or five-factor models in the recent literature—cannot adequately summarize the cross-section of expected stock returns. However, an SDF formed from a small number of principal components performs well.

Why Do Discount Rates Vary? (with Shrihari Santosh)

Journal of Financial Economics, September 2020, 137(3), 740-751.

Abstract: The price of discount rate risk reveals whether increases in equity risk premia represent good or bad news to rational investors. Employing a new empirical methodology, we find that the price is negative, which suggests that discount rates are high during times of high marginal utility of wealth. Our approach relies on using future realized market returns to consistently estimate covariances of asset returns with the market risk premium. Covariances drive observed patterns in a broad cross section of stock and bond expected returns.

Factor Timing (with Valentin Haddad and Shrihari Santosh)

Review of Financial Studies, May 2020, 33(5), 1980-2018.

2018 Q-Group Jack Treynor Prize

Abstract: The optimal factor timing portfolio is equivalent to the stochastic discount factor. We propose and implement a method to characterize both empirically. Our approach imposes restrictions on the dynamics of expected returns which lead to an economically plausible SDF. Market-neutral equity factors are strongly and robustly predictable. Exploiting this predictability leads to substantial improvement in portfolio performance relative to static factor investing. The variance of the corresponding SDF is larger, more variable over time, and exhibits different cyclical behavior than estimates ignoring this fact. These results pose new challenges for theories that aim to match the cross-section of stock returns.

WORKING PAPERS

Dynamics of Bond and Stock Returns

Journal of Monetary Economics, Revise and Resubmit.

Abstract: I present a production-based equilibrium model that jointly prices bond and stock returns. The model produces time-varying correlation between stock and long-term default-free real bond returns that changes in both magnitude and sign. The real term premium is also time-varying and changes sign. To generate these results, the model incorporates time-varying risk aversion within Epstein-Zin preferences and two physical technologies with different cash-flow risk. Bonds hedge risk-aversion (discount-rate) shocks and command negative term premium through this channel. Capital (cash-flow) shocks produce co-movement of bond and stock returns and positive term premium. Relative strength of these two mechanisms varies over time.

Equity Term Structures without Dividend Strips Data (with Stefano Giglio and Bryan Kelly)

Abstract: We use a large cross-section of equity returns to estimate a rich affine model of equity prices, dividends, returns and their dynamics. Using the model, we price dividend strips of the aggregate market index, as well as any other well-diversified equity portfolio. We do not use any dividend strips data in the estimation of the model; however, model-implied equity yields generated by the model match closely the equity yields from the traded dividend forwards reported in the literature. Our model can therefore be used to extend the data on the term structure of discount rates in three dimensions: (i) over time, back to the 1970s; (ii) across maturities, since we are not limited by the maturities of actually traded dividend claims; and most importantly, (iii) across portfolios, since we generate a term structure for any portfolio of stocks (e.g., small or value stocks). The new term structure data generated by our model (e.g., separate term structures for value, growth, investment and other portfolios, observed over a span of 45 years that covers several recessions) represent new empirical moments that can be used to guide and evaluate asset pricing models.

Kernel Trick for the Cross Section

Abstract: Characteristics-based asset pricing implicitly assumes that factor betas or risk prices are linear functions of pre-specified characteristics. Present-value identities, such as Campbell-Shiller or clean-surplus accounting, however, clearly predict that expected returns are highly non-linear functions of all characteristics. While basic non-linearities can be easily accommodated by adding non-linear functions to the set of characteristics, the problem quickly becomes infeasible once interactions of characteristics are considered. I propose a method which uses economically-driven regularization to construct a stochastic discount factor (SDF) when the set of characteristics is extended to an arbitrary—potentially infinitely-dimensional—set of non-linear functions of original characteristics. The method borrows ideas from a machine learning technique known as the “kernel trick” to circumvent the curse of dimensionality. I find that allowing for interactions and non-linearities of characteristics leads to substantially more efficient SDFs; out-of-sample Sharpe ratios for the implied MVE portfolio double.

Access to Credit and Stock Market Participation (with Denis Sosyura)

Abstract: We exploit staggered removals of interstate banking restrictions to identify the causal effect of access to credit on households’ stock market participation and asset allocation. Using micro data on retail brokerage accounts and proprietary data on personal credit histories, we document two effects of the loosening of credit constraints on households’ financial decisions. First, households enter the stock market by opening new brokerage accounts. Second, households increase their asset allocation to risky assets and reduce their allocation to cash, consistent with a lower need for precautionary savings. The effects are stronger for younger and more credit constrained investors. Overall, we establish one of the first direct links between access to credit and households’ investment decisions.

TEACHING

<i>Machine Learning for Finance</i> , Maryland MSF and MQF	F2019
<i>Financial Data Analytics</i> , Maryland MSF and MQF	F2019
<i>Empirical Asset Pricing</i> , Michigan PhD	W2018, W2019
<i>Fixed Income Securities and Markets</i> , Michigan MBA and BBA	W2016, W2018
<i>Capital Markets and Investment Strategy</i> , Michigan BBA	2016 – 2019
<i>Financial Management</i> , Michigan BBA core	2013 – 2015

PROFESSIONAL SERVICE

Referee: *Econometrica*, *Journal of Econometrics*, *Journal of Empirical Finance*, *Journal of Finance*, *Journal of Financial Econometrics*, *Journal of Financial and Quantitative Analysis*, *Journal of Financial Economics*, *Journal of Financial Markets*, *Journal of Political Economy*, *Management Science*, *Review of Finance*, *Review of Financial Studies*.

Dissertation committee: Koustav De (University of Kentucky), Zhen Yan (Cornerstone Research), Bingkuan Cao.

NON-ACADEMIC EXPERIENCE

Eleks, Lviv, Ukraine 2000 – 2006
Software Engineer

PROGRAMMING LANGUAGES AND PLATFORMS

Python, C++, SQL, TensorFlow, CUDA, Matlab, SAS, Mathematica, R, GAMS, Stata.

CONFERENCE AND SEMINAR PRESENTATIONS

- 2020: American Finance Association Meetings (discussion, session chair), RCFS/RAPS Winter Conference (discussion), Duke/UNC Asset Pricing Conference, Tilburg University, SFS Finance Cavalcade (presentation, session chair), Western Finance Association Meetings (session chair), University of Hong Kong.
- 2019: ASSA Econometric Society Meetings, Emory University, Duke University, University of California San Diego Rady, Chicago Booth Asset Pricing Conference.
- 2018: American Finance Association Meetings, ASU Sonoran Winter Finance Conference (discussion), UBC Winter Finance Conference, Financial Intermediation Research Society Conference, Western Finance Association Meetings, NBER Summer Institute Asset Pricing Meetings, Stanford Institute for Theoretical Economics (SITE) Asset Pricing Theory and Computation Workshop, Red Rock Finance Conference, New Methods for the Cross Section of Returns Conference, London School of Economics, University of Washington, Minnesota Finance Department Junior Conference, University of Maryland, NBER Asset Pricing Meetings (discussion), Tel Aviv University, IDC Herzliya.
- 2017: American Finance Association Meetings, NBER Asset Pricing Meetings, City University of Hong Kong, Hong Kong University of Science and Technology, Arizona State University, Dartmouth College, Stockholm School of Economics, Imperial College Business School Conference on Advances of Hedge Fund Strategies, Colorado Finance Summit.
- 2016: American Finance Association Meetings (presentation and discussion), Finance Down Under Conference, UCLA Anderson, SFS Finance Cavalcade (presentation and discussion), MoFiR Workshop on Banking.
- 2015: American Finance Association Meetings, NBER Summer Institute Asset Pricing Meetings, MIT Sloan, European Finance Association Meetings (presentation and discussion), TAU Finance Conference, Florida State University SunTrust Beach Conference (discussion), Finance Down Under Conference, Washington University Corporate Finance Conference, FDIC Banking Research Conference, Chicago Financial Institutions Conference, HKUST Corporate Finance Symposium.
- 2014: Midwest Finance Association Meetings (presentation and discussion), University of Michigan, Emory University, University of Illinois Urbana/Champaign, University of Wisconsin.