

RAN SHI

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Research Fields	Asset pricing, International Finance, Financial Economics		
Education	London School of Economics 2016-present MRes. in Finance (with Distinction), Ph.D. candidate in Finance <u>Dissertation</u> : “Essays in Asset Pricing” <u>Expected Completion Date</u> : May 2022 <u>Placement coordinator</u> : Professor Dirk Jenter, d.jenter@lse.ac.uk <u>Reference</u> : Professor Ian Martin Professor Kathy Yuan Department of Finance, Department of Finance, London School of Economics London School of Economics i.w.martin@lse.ac.uk k.yuan@lse.ac.uk Professor Dimitri Vayanos Department of Finance, London School of Economics d.vayanos@lse.ac.uk Emory University 2016 Ph.D. in Biostatistics Peking University 2011 B.S. in Biology, B.S. in Statistics		
Working Papers	A Quantitative Model of Limited Arbitrage in Currency Markets: Theory and Estimation (Job Market Paper) I develop and estimate a limits-to-arbitrage model to quantify the effects of financial constraints, arbitrage capital, and hedging demands on asset prices and their deviations from frictionless benchmarks. Using foreign exchange derivatives market data, I find that varying financial constraints and hedging demands contribute to 46 and 35 percent variation in the deviations from covered interest		

parity of one-year maturities. While arbitrage capital fluctuation explains the remaining 19 percent of variation on average, it periodically stabilizes prices when the other two forces exert disproportionately large impacts. The model features a general form of financial constraints and produces a nonparametric arbitrage profit function. I unveil shapes and dynamics of financial constraints from estimates of this function.

Option-implied Bounds for the Crash Probability of a Stock

with Ian Martin

We propose a framework to compute sharp bounds of the crash probability of an individual stock using option prices. Empirical tests suggest that these bounds are close to the exact forward-looking crash probabilities. They drive out stock characteristics reported in the literature in terms of explaining crash probability variation. Out of sample, either the lower or upper bound outperforms combinations of stock characteristics in terms of forecasting stock-specific crash events. Applying the framework to study the equity of global systemically important banks (G-SIBs) gives rise to forward-looking fragility and stability measures of the global financial system.

Model Uncertainty in the Cross Section

with Jiantao Huang

We develop a transparent Bayesian approach to quantify uncertainty in linear stochastic discount factor (SDF) models. We show that, for a Bayesian decision maker, posterior model probabilities increase with maximum in-sample Sharpe ratios and decrease with model dimensions. Entropy of posterior probabilities represents model uncertainty. We apply our approach to quantify the time series of model uncertainty in North American, European, and Asian Pacific equity markets. Model uncertainty is countercyclical in these markets before the 2008 financial crisis, but remains high afterwards. It predicts investors' asset allocation decisions across equity and fixed-income funds. In survey data, investors tend to be more pessimistic about equity performance during periods of higher model uncertainty.

The Spread of COVID-19 in London: Network Effects and Optimal Lock-downs

with Christian Julliard and Kathy Yuan, revise and resubmit, *Journal of Econometrics*

We generalize a stochastic version of the workhorse SIR (Susceptible-Infectious-Removed) epidemiological model to account for spatial dynamics generated by network interactions. Using the London metropolitan area as a salient case

study, we show that commuter network externalities account for about 42% of the propagation of COVID-19. We find that the UK lockdown measure reduced total propagation by 57%, with more than one third of the effect coming from the reduction in network externalities. Counterfactual analyses suggest that: i) the lockdown was somehow late, but further delay would have had more extreme consequences; ii) a targeted lockdown of a small number of highly connected geographic regions would have been equally effective, arguably with significantly lower economic costs; iii) targeted lockdowns based on threshold number of cases are not effective, since they fail to account for network externalities.

Teaching	Class teacher for Fixed Income Markets, Principles of Finance, Alternative Investments at London School of Economics
	Teaching assistant for Statistical Inference, Advanced Linear Models at Emory University
Honors and Awards	Distinguished student paper award, International Biometric Society 2016
	Student paper competition award on Bayesian statistical science, American Statistical Association 2015
	Student paper competition award on statistics in imaging (declined), American Statistical Association 2015
Non-academic Experiences	U.S. Centers for Disease Control and Prevention, <i>fellow statistician</i> 2014
Other Publications	Ran Shi and Ying Guo. Investigating Differences in Brain Functional Networks Using Hierarchical Covariate-adjusted Independent Component Analysis. <i>Annals of Applied Statistics</i> , 2016
	Jian Kang, Nanhua Zhang and Ran Shi. A Bayesian Nonparametric Model for Spatially Distributed Multivariate Binary Data with Application to a Multidrug-resistant Tuberculosis (MDR-TB) Study. <i>Biometrics</i> , 2015
	Rania A. Tohme, Jocelyne Andre-Alboth, Alexandra Tejada-Strop, Ran Shi, et al. Hepatitis B Virus Infection among Pregnant Women in Haiti: a Cross-Sectional Serosurvey. <i>Journal of Clinical Virology</i> , 2016
	J. Scott Cordova, Saumya S. Gurbani, Chad A. Holder, Jeffrey J. Olson, Eduard

Schreibmann, Ran Shi, et al. Semi-Automated Volumetric and Morphological Assessment of Glioblastoma Resection with Fluorescence-Guided Surgery. *Molecular Imaging and Biology*, 2015

Seok Woo Moon, Ivo D. Dinov, Sam Hobel, Alen Zamanyan, Ran Shi, et al. Structural Brain Changes in Early-onset Alzheimer's Disease Subjects Using the LONI Pipeline Environment. *Journal of Neuroimaging*, 2015

Seok Woo Moon, Ivo D. Dinov, Alen Zamanyan, Ran Shi, et al. Gene Interactions and Structural Brain Change in Early-onset Alzheimer's Disease Subjects Using the Pipeline Environment. *Psychiatry Investigation*, 2015