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**Placement Directors:** Professor Ufuk Akcigit, [uakcigit@uchicago.edu](mailto:uakcigit@uchicago.edu), (773) 702-0433

**Graduate Student Coordinator:** Robert Herbst, [herbst@uchicago.edu](mailto:herbst@uchicago.edu), (773) 834-1972

**Education**

The University of Chicago, 2013 to present

Ph.D. Candidate in Economics

Thesis Title: “*Sectoral Shifts, Production Networks, and the Term Structure of Equity*”

Ph.D. Economics, University of Chicago, 2021 (expected)

M.A. Economics, University of Chicago, 2016

B.A. Economics, B.S. Mathematics; Brigham Young University, 2013

**References:**

Professor Harald Uhlig (Chair)

Univ. of Chicago, Dept. of Economics  
(773) 702-3702, [huhlig@uchicago.edu](mailto:huhlig@uchicago.edu)

Professor Ralph S. J. Koijen

Univ. of Chicago, Booth School of Business  
(773) 834-4890, [ralph.koijen@chicagobooth.edu](mailto:ralph.koijen@chicagobooth.edu)

Professor Lars Peter Hansen

Univ. of Chicago, Dept. of Economics  
(773) 702-3908, [lhansen@uchicago.edu](mailto:lhansen@uchicago.edu)

**Teaching and Research Fields**

Primary fields: Financial Economics, Macroeconomics

Secondary fields: Asset Pricing, Computational Economics

**Teaching Experience**

Spring 2019      ECON 21410: Computational Methods in Economics. Univ. of Chicago. College  
&                      Lecturer (undergraduate course)

Spring 2018

Fall Quarters:      FINM 36700: Portfolio Theory and Risk Management I, Univ. of Chicago,  
2015, 2016,          Teaching Assistant, Hendricks. (MA course)  
2018, 2019

Fall Quarters:      FINM 35000: Topics in Economics, Univ. of Chicago, Teaching Assistant,  
2015, 2016,          Hendricks. (MA course)  
2017

Fall 2018              STAT 32940: Multivariate Data Analysis via Matrix Decomposition. Univ. of  
Chicago. Teaching Assistant, Lim. (MA course)

Fall Quarters:      BUSF 35001: Introductory Finance, Univ. of Chicago, Booth School of Business.  
2016, 2017,          Teaching Assistant, Leftwich. (MBA course)  
2018

Fall 2015	BUSX 35880. Portfolio Management. Univ. of Chicago, Booth School of Business. Teaching Assistant, Chevrier. (MBA course)
Fall 2016	ECON 21000: Econometrics. Univ. of Chicago. Teaching Assistant, Hickman. (undergraduate course)

### **Honors, Scholarships, and Fellowships**

2018-2019	Beryl W. Sprinkel Ph.D. Fellowship
2019	Undergraduate Teaching Award
2016	Ph.D. Student Research Support Grant, Fama-Miller Center for Research in Finance
2013-2014	National Science Foundation Graduate Research Fellowship, Honorable Mention
2013-2018	University of Chicago, Social Sciences Fellowship

### **Computer Skills**

Proficient: Python (Numerical and Data Science Stack), R, Git, GitHub, LaTeX, Matlab, High Performance Computing with MPI

Other: Stata, Excel, C, SQL

### **Job Market Paper**

*“Sectoral Shifts, Production Networks, and the Term Structure of Equity”*

In this paper, I argue that the term structure of equity as characterized by expected holding period returns on dividend strips can be used as a diagnostic to evaluate the quantity dynamics that arise in a macroeconomic model. I do this by showing that the risk exposures associated with dividend futures are equal to the impulse responses aggregate consumption with respect to the underlying shocks. As an application, I derive the asset pricing implications of a multi-sector production network model and use this to shed light on relative importance of idiosyncratic and aggregate total factor productivity (TFP) shocks. Though aggregate TFP in the U.S. over the last 60 years has grown approximately 1.4 percent annually, these gains have been dispersed across individual sectors, with some sectors even seeing substantial declines. This dispersion is either the result of idiosyncratic sectoral shocks or aggregate shocks that shift the composition of the economy without necessarily affecting long-run aggregate output. Decomposing the contribution of each shock to this term structure of equity, I show that the shift shocks contribute to a downward sloping term structure of equity while others contribute to an upward sloping term structure. Thus, imposing a downward sloping term structure in this model amounts to putting a lower bound on the contribution of aggregate shifts relative to other shocks.

### **Work in Progress**

*“Asset Pricing and the Importance of Sectoral Shocks”*

In this paper, I propose using risk prices inferred from asset returns data to measure the relative importance of sectoral TFP shocks. Risk prices measure the marginal compensation that a representative investor requires in exchange for a unit increase in exposure to a source of macroeconomic risk. I utilize the shock-price elasticities developed Borovička and Hansen (2014) to characterize these risk prices in a set of multisector models. I show that in a simple two-period model production network model, the measure of relative importance a sector's shocks is the same whether we use Domar weights, the network-based influence vector measure of Acemoglu et al (2012), or the shock's associated risk price. In contrast, I show that these measures can differ in multi-period models. I analyze several such models. Using the TFP shocks identified by each model, I propose measuring these risk prices empirically by projecting the sectoral shock onto a panel of asset returns to construct factor mimicking portfolios and measuring the associated returns and factor premia.

*“Dividend Growth Dynamics and the Term Structure of Equity”*

I explore the consequences of adding a small, transitory, mean-reverting component to dividend growth dynamics within several classic asset pricing models, such as the consumption CAPM, long-run risk, and external habits. Recent evidence that suggests that the term structure of equity as characterized by holding period returns on dividend strips is downward sloping is at odds with the traditional specification of many of these asset pricing models. I show that these models can have limited success in matching this stylized fact by adjusting cash flow growth dynamics in this way. To understand the principal mechanism, I demonstrate that, within a class of log-linear, affine models, a tight link exists between the risk exposures associated with these holding period returns and the impulse responses of cash flow growth.

**Working Papers**

*“A Big Data Approach to Optimal Sales Taxation”*, with Christian Baker, Richard W. Evans, Kenneth L. Judd, and Kerk L. Phillips. NBER Working Paper # 20130

We characterize and demonstrate a solution method for an optimal commodity (sales) tax problem consisting of multiple goods, heterogeneous agents, and a nonconvex policy maker optimization problem. Our approach allows for more dimensions of heterogeneity than has been previously possible, incorporates potential model uncertainty and policy objective uncertainty, and relaxes some of the assumptions in the previous literature that were necessary to generate a convex optimization problem for the policy maker. Our solution technique involves creating a large database of optimal responses by different individuals for different policy parameters and using "Big Data" techniques to compute policy maker objective values over these individuals. We calibrate our model to the United States and test the effects of a differentiated optimal commodity tax versus a flat tax and the effect of exempting a broad class of goods (services) from commodity taxation. We find that only a potentially small amount of tax revenue is lost for a given societal welfare level by departing from an optimal differentiated sales tax schedule to a uniform flat tax and that there is only a small loss in revenue from exempting a class of goods such as services in the United States.