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Personal Information: DOB September 23, 1985, Male, US Citizen

Undergraduate Studies:

B.S., Economics, University of Michigan, Highest honors, 2008
B.S., Mathematics, University of Michigan, Highest honors, 2008

Graduate Studies:

Harvard University, 2010 to present
Ph.D. Candidate in Economics
Thesis Title: "Essays on the Financial and Housing Markets"
Expected Completion Date: May 2013

A.M., Harvard University, 2010

References:

Professor John Y. Campbell
Harvard University, Littauer 213
617-496-6448, john_campbell@harvard.edu

Professor Edward Glaeser
Harvard University, Littauer 315A
617-496-2150, eglaeser@harvard.edu

Professor Emmanuel Farhi
Harvard University, Littauer 318
617-496-1835, efarhi@fas.harvard.edu

Professor Alp Simsek
Harvard University, Littauer 319
617-496-3374, asimsek@fas.harvard.edu

Teaching and Research Fields:

Research Fields: Finance, Macroeconomics, Housing

Teaching fields: Asset Pricing, Corporate Finance, Macroeconomics, Housing, Econometrics, Game Theory

Teaching Experience:

Spring, 2010 **Economic Theory** (Ec 2010d), Harvard University, Ph.D. Economics, teaching fellow for Kenneth Rogoff
Fall, 2010 **Introduction to Econometrics** (Ec 1123), Harvard University, Harvard College, teaching fellow for James H. Stock
Spring, 2011 **Corporate Finance** (Ec 1745), Harvard University, Harvard College, teaching fellow for Elias Papaioannou
Fall, 2011 **Economic Theory** (Ec 2010a), Harvard University, Ph.D. Economics, teaching

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| | fellow for Jerry R. Green |
| Fall, 2011 | Asset Pricing I (Ec 2723), Harvard University, Ph.D. Economics, teaching fellow for John Y. Campbell |
| Spring, 2012 | Macroeconomic Theory (1011b), Harvard University, Harvard College, teaching fellow for Elias Papaioannou and Sebnem Kalemli-Ozcan |
| Spring, 2012 | Advanced Macroeconomics for the Open Economy II (API 119), Harvard University, Kennedy School, teaching fellow for Elias Papaioannou and Sebnem Kalemli-Ozcan |

Research Experience and Other Employment:

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| Apr 2006 | University of Michigan, REU Researcher (Ann Arbor) |
| Sept 2006 | |
| May 2007 | UBS Investment Bank, Summer Analyst (New York City) |
| August 2007 | |

Professional Activities:

Seminars and Presentations

“Enforcement, Evasion and Informality: Theory and Practice,” International Policy Center, Gerald R. Ford School of Public Policy, University of Michigan, June 2010
 “Housing and the Financial Crisis,” NBER Summer Institute, National Bureau of Economic Research, July 2012
 “Money, Banking, Payment, and Finance,” Chicago Federal Reserve, August 2012
 “Search and Matching Workshop,” University of Pennsylvania, October 2012
 “Urban and Real Estate Economics Seminar,” Boston Federal Reserve, October 2012

Referee Activities: *Quarterly Journal of Economics*

Honors, Scholarships, and Fellowships:

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| 2012-2013 | Bradley Fellowship |
| 2012-2013 | Harvard Dissertation Completion Fellowship |
| 2008-2010 | Harvard University Graduate Fellowship |
| May 2008 | Fernando Honors Prize for Most Outstanding Senior in Economics |
| May 2008 | Thesis Prize for Best Undergraduate Thesis in Economics |
| May 2008 | Michigan Mathematics Merit Scholar |

Research Papers:

“*Stochastic Volatility and Three Puzzles in Finance*” ([Job Market Paper](#))

This paper builds a real-options, term structure model of the firm to offer a potential resolution to the value premium puzzle, the financial distress puzzle, the momentum puzzle, and the credit spread puzzle. The model incorporates stochastic volatility in the firm productivity process and a negative market price of volatility risk. Since the equity of growth firms and financially distressed firms have embedded options, such securities hedge against volatility risk in the market and thus command lower volatility risk premia than the equities of value or non-financially distressed firms. Conversely, since increases in volatility generally adversely affect the value of debt, corporate debt will tend to command large volatility risk premia, allowing the model to generate higher credit spreads than existing structural models. The paper illustrates that allowing endogenous default by equityholders is necessary for the model to account for the credit spreads of both investment grade and junk debt. The model is extended to include rare disasters and multiple time scales in volatility dynamics to better account for the expected default frequencies and credit spreads of short maturity debt. Finally, the paper utilizes a methodology based on regular perturbations to solve the model.

“How Do Foreclosures Exacerbate Housing Downturns?” (with Adam Guren)

The ongoing housing bust precipitated a wave of mortgage defaults, with over seven percent of the owner-occupied housing stock experiencing a foreclosure. This paper presents a model that shows how foreclosures can exacerbate a housing bust and delay the housing market’s recovery. By raising the ratio of sellers to buyers, by making buyers more selective, and by changing the composition of houses that sell, foreclosures freeze up the market for retail (non-foreclosure) sales and reduce both price and volume. Because negative equity is necessary for default, these general equilibrium effects on prices can create price-default spirals that amplify an initial shock. To assess the magnitude of these channels, the model is calibrated to simulate the downturn. The amplification channel is significant. The model successfully explains aggregate and retail price declines, the foreclosure share of volume, and the number of foreclosures both nationwide and across MSAs. While the model can explain variation in sales across MSAs, it cannot account for the aggregate level of the volume decline, suggesting that other forces have reduced sales nationwide. The quantitative analysis implies that in the last several years foreclosures exacerbated aggregate price declines by approximately 50 percent and declines in the prices of retail homes by approximately 30 percent.

“Large Markets with Untraceable Goods of Unknown Quality: A Market Failure Exacerbated by Globalization” (with Stephen W. Salant and Jason Winfree)

In markets for fruits, vegetables, and many imported goods, consumers cannot discern quality prior to purchase and can never identify the producer. Producing high-quality, safe goods is costly and raises the “collective reputation” for quality shared with competitors. By dropping the “small country” assumption of the trade literature on collective reputation, we show how large exporters like China, with its severe problems assuring the quality of its exports, can address its collective reputation problems.

Publications:

“Regulating an Experience Good Produced in the Formal Sector of a Developing Country when Consumers Cannot Identify Producers” (with Stephen W. Salant and Jason Winfree), *Review of Development Economics*, Vol. 16 (2012), 512-526

In developing countries, consumers can buy many goods either in formal markets or in informal markets and decide where to purchase based on the product’s price and anticipated quality. We assume consumers cannot assess quality prior to purchase and cannot, at reasonable cost, identify who produced the good they are considering. Many products (meats, fruits, vegetables, fish, grains) sold both in formal groceries and, less formally, on the street fit this description. We assume that producers can adjust quality at a cost and only firms in the formal sector are subject to government regulation. In the long run, producers migrate to the sector that is more profitable. Using this model, we demonstrate how regulations in the formal sector can lead to a quality gap between formal and informal sector goods. We moreover investigate how changes in regulation affect quality, price, aggregate production, and the number of firms in each sector.

“Information Invariant Equilibria of Extensive Games” (with Tilman Börgers), *The B.E. Journal of Theoretical Economics (Contributions)*, Vol. 7 (2007), 477-489

We show that several properties of ex post equilibria in static games do not carry over to extensive games provided that one insists on sequential rationality of the equilibrium strategies. In particular, in static games ex post equilibria constitute equilibria for a much larger variety of incomplete information environments than the definition of ex post equilibrium refers to while in dynamic games this is not necessarily the case if the equilibrium concept is sequential equilibrium. We introduce the concept of “strongly information invariant equilibrium” and show that this is a more restrictive concept than “ex post sequential equilibrium.” Strongly information invariant or ex post sequential equilibria often don’t exist, but strategy combinations that satisfy the slightly less demanding requirements of “weakly information invariant sequential equilibrium” do exist. We argue that the auction literature has often implicitly used the notion of weakly information invariant sequential equilibrium while referring to such equilibria as “ex post equilibria.” We also show that the familiar relation between ex post equilibria and dominant strategies in static games with private values does not carry over to extensive games.