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UNIVERSITY OF PENNSYLVANIA

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Personal Information: Female, South Korea (F-1 Visa)

Undergraduate Studies:

B.A., Economics, Seoul National University, *Summa Cum Laude*, 2011

Master Level Work:

M.A., Economics, University of Pennsylvania, 2015
M.A., Economics, Seoul National University, 2013

Graduate Studies:

University of Pennsylvania, 2013 to present
Thesis Title: "Essays on Heterogeneity in Macroeconomics"
Expected Completion Date: May 2019

Thesis Committee and References:

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| Professor Jesús Fernández-Villaverde (Co-advisor) University of Pennsylvania 133 South 36th Street, Office 521 Philadelphia, PA, 19104 Phone: +1 (215) 898-1504 Email: jesusfv@econ.upenn.edu | Professor Frank Schorfheide (Co-advisor) University of Pennsylvania 133 South 36th street, Office 621 Philadelphia, PA, 19104 Phone: +1 (215) 898-8486 Email: schorf@econ.upenn.edu |
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Teaching and Research Fields:

Quantitative macroeconomics, Econometrics

Teaching Experience:

Spring 2018, 2017 PIER Workshop on Quantitative Tools for Macroeconomics, University of Pennsylvania, *Lab Instructor*

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| Summer 2017 | Statistics for Economists (Undergraduate), University of Pennsylvania, <i>Instructor</i> |
| Fall 2015, 2014 | Econometrics I (Graduate), University of Pennsylvania, <i>Teaching Assistant</i> for Professor Frank Schorfheide and Professor Xu Cheng |
| Spring 2015 | Econometrics (Undergraduate), University of Pennsylvania, <i>Teaching Assistant</i> for Professor Frank Diebold |
| Spring 2012, Fall 2011 | Econometrics (Undergraduate), Seoul National University, <i>Teaching Assistant</i> for Professor Yoon-Jae Whang |

Research Experience and Other Employment:

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| 2016-Present | Research Assistant for Professor Frank Schorfheide |
| Summer 2016 | Dissertation Fellow, Federal Reserve Bank of Richmond |
| 2011-Summer 2013 | Research Assistant for Professor Yoon-Jae Whang |

Professional Activities:

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| Presentations: | MFM Summer Session for Young Scholars (Poster Session), Cape Cod, 2018 NBER-NSF SBIES, Stanford University, 2018 |
| Referee: | International Economic Review |

Honors, Scholarships, and Fellowships:

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| 2017-2018 | Maloof Family Dissertation Fellowship, University of Pennsylvania |
| 2013-2017 | University Fellowship, University of Pennsylvania |
| 2013-2017 | Kwanjeong Educational Foundation Scholarship |
| 2011-2012 | BK21 Scholarship, National Research Foundation of Korea |
| 2011 | Graduate of Highest Honor, Seoul National University |

Publications:

“A Generalized Focused Information Criterion for GMM with Applications to Panel Data Models,”
Journal of Applied Econometrics, 2018, 33(3), pp.378-397
(with Francis J. DiTraglia)

“Nonparametric Tests of Conditional Treatment Effects with an Application to Single-Sex Schooling on Academic Achievements,” *The Econometrics Journal*, 2015, 18(3), pp.307-346
(with Sokbae S. Lee and Yoon-Jae Whang)

Research Papers:

“A House Without a Ring: The Role of Changing Marital Transitions for Housing Decisions”
(Job Market Paper)

This paper shows that the evolving likelihood of marriage and divorce is an essential factor in accounting for the changes in housing decisions over time in the United States. To quantify the importance of this channel, I build a life-cycle model of single and married households who face exogenous age-dependent marital transition shocks. I then estimate the parameters of the model by a limited information Bayesian method to match the moments from 1995’s cross-section data. I conduct a decomposition analysis between 1970 and 1995, two years with similar real house prices but substantially different probabilities of marital transitions. I find that the change in the likelihood of marital transitions accounts for 29% of the observed increase in the homeownership rate of singles. This portion is substantial given that the changes in downpayment requirements, earnings risk, and spousal labor productivity jointly replicate 45% of the change. When the change in marital transitions is shut down, the marrieds’ housing asset share increases, which is opposite to the data’s pattern. Then I extend my analysis to study whether the ongoing change in marital transitions still plays

a role in explaining housing decisions in recent years, which have seen dramatically changing house prices. In addition to other factors such as credit constraints, wages, and beliefs on price appreciation that are often suggested as drivers for homeownership increase during the housing boom in the mid-2000s, I show that the continuing decrease in marriage contributes to an approximately 7% increase in the homeownership rate for young singles.

“Heterogeneity and Aggregate Fluctuations” (with Xiaohong Chen and Frank Schorfheide)

We develop a state-space model with a state-transition equation that takes the form of a functional vector autoregression and stacks macroeconomic aggregates and a cross-sectional density. The measurement equation captures the error in estimating log densities from repeated cross-sectional samples. The log densities and the transition kernels in the law of motion of the states are approximated by sieves, which leads to a finite-dimensional representation in terms of macroeconomic aggregates and sieve coefficients. We use this model to study the joint dynamics of technology shocks, per capita GDP, employment rates, and the earnings distribution. We find that the estimated spillovers between aggregate and distributional dynamics are generally small, a positive technology shocks tends to increase the fraction of individuals earning less than the labor share of per capita GDP, and shocks that raise the inequality of earnings have ambiguous effects on per-capita GDP.

“Bypassing the Curse of Dimensionality: Feasible Multivariate Density Estimation”

(with Paul Sangrey)

Most economic data are multivariate and so estimating multivariate densities is a classic problem in the literature. However, given vector-valued data — $\{x_t\}_{t=1}^T$ — the *curse of dimensionality* makes nonparametrically estimating the data’s density infeasible if the number of series D is large. Hence, we do not seek to provide estimators that perform well all of the time (it is impossible), but rather seek to provide estimators that perform well most of the time. We adapt the ideas in the Bayesian compression literature to this environment by randomly binning the data. The binning randomly determines both the number of bins and which observation is placed in which bin. This novel procedure induces a simple mixture representation for the data’s density. For any finite number of periods T , the number of mixture components used is random. We construct a bound for this variable as a function of T that holds with high probability. We adopt the nonparametric Bayesian framework and construct a computationally efficient density estimator using Dirichlet processes. Since the number of mixture components is the key determinant of our model’s complexity, our estimator’s convergence rates — $\sqrt{\log(T)}/\sqrt{T}$ in the unconditional case and $\log(T)/\sqrt{T}$ in the conditional case — depends on D only through the constant term. We then analyze our estimator’s performance in a monthly macroeconomic panel and a daily financial panel. Our procedure performs well in capturing the data’s stylized features such as time-varying volatility and fat-tails.

Research Paper in Progress:

“Estimating Heterogeneous Agent Models: A Likelihood Approach with Particle Filter”

Heterogeneous agent macroeconomic models have mostly relied on calibration, which cannot make testable statements regarding parameter uncertainty and its statistical significance. This paper illustrates how to estimate a heterogeneous agent model similar to Krusell and Smith (1998) with Bayesian particle filtering.

Languages: English (fluent), Korean (native), French (basic)

Computational Skills: Julia, MATLAB, Python, R (Rcpp), Stata, Eviews

Software: [cdpm](#) (Python package to provide estimators in “Bypassing the Curse of Dimensionality: Feasible Multivariate Density Estimation” paper)