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Personal Information:

Date of Birth: August 17, 1988
Citizenship: Mexican
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Undergraduate Studies:

B.A., Economics, ITAM, Highest Honors, 2011

Masters Level Work:

M.A., Economic Theory, ITAM, Honors, 2015
M.A., Economics, University of Pennsylvania, 2017

Graduate Studies:

University of Pennsylvania, 2015 to present
Thesis Title: "Essays on Financial Crises"
Expected Completion Date: May 2021

Thesis Committee and References:

Professor Enrique G. Mendoza (Co-Advisor)
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Teaching and Research Fields:

International Economics, Macro-Finance, Public Economics, Macroeconometrics.

Teaching Experience:

Fall, 2020	Econometrics (undergraduate), UPenn, teaching assistant for Professor Xu Cheng
Fall, 2018	International Finance (undergraduate), UPenn, teaching assistant for Professor Enrique G. Mendoza
Spring, 2017	Macroeconomics (graduate), UPenn, teaching assistant for Professor Jeremy Greenwood
Fall, 2016	Microeconomics (undergraduate), UPenn, teaching assistant for Professor Rakesh Vohra

Research Experience and Other Employment:

2017 to present	University of Pennsylvania and Becker Friedman Institute, Research Assistant for Professor Frank Schorfheide
Summer 2020	Dissertation Scholar. Federal Reserve Bank of Atlanta, Research Department
Summer 2019	Quantitative Researcher, Citadel, Global Fixed Income
2018 - 2019	University of Pennsylvania, Research Assistant for Professor Enrique G. Mendoza
Summer 2018	NBER, Research Assistant for Professor Dirk Krueger
2012 - 2015	Economist, Central Bank of Mexico, Economic Research Division

Honors, Scholarships, and Fellowships:

2019	UPenn PIER RA Stipend Matching Grant Awarded
2018	UPenn The President Gutmann Leadership Award
2018	UPenn SAS Dean's Travel Grant
2015-2021	UPenn University Fellowship

Publications:

"FiPIt, A Simple, Fast Global Method for Solving Models with Two Endogenous States & Occasionally Binding Constraints", **Review of Economic Dynamics**, 2020, 37, 81-102. (with Enrique G. Mendoza)

Abstract: We propose a simple and fast fixed-point iteration algorithm (FiPIt) to obtain the global, non-linear solution of macro models with two endogenous state variables and occasionally binding constraints. This method uses fixed-point iteration on Euler equations to avoid solving two simultaneous non-linear equations (as with the time iteration method) or creating modified state variables requiring irregular interpolation (as with the endogenous grids method). In the small-open-economy RBC and Sudden Stops models provided as examples, FiPIt is much faster than time iteration and various hybrid methods.

"The effect of natural gas shortages on the Mexican economy", **Energy Economics**, 2017, Num 66. (with Carlo Alcaraz) Pre-PhD.

"Decomposition of financial crises in Mexico", **Gaceta de Economía**, 2015, No. 34, ITAM. Pre-PhD

Research Papers:

"*Inequality and Asset Prices during Sudden Stops*".
(**Job Market Paper**)

Presentations: University of Pennsylvania (2019, 2020), Atlanta Fed (2020), Board Fed (2020), ITAM (2020).
Abstract: This paper studies the cross-sectional dimension of Fisher's debt-deflation mechanism that triggers financial crises of the Sudden Stop type - i.e., episodes with large reversals in the current account. Analyzing micro-data from Mexico for the 2009 crisis, we show that this mechanism's cross-sectional dimension has macroeconomic implications that operate via two opposing effects. First, an amplifying effect by which households with high leverage fire-sale their assets during a crisis, increasing downward pressure on asset prices. Second, a dampening effect by which wealthy households with low leverage buy depressed assets, relieving downward pressure on asset prices. As a result, the role of inequality during crises is ambiguous. We conduct a quantitative analysis using a calibrated small-open-economy asset-pricing model with heterogeneous-agents to measure the effects of inequality on the frequency and severity of financial crises. As in representative-agent models of Sudden Stops, the model features a loan-to-value collateral constraint that triggers Sudden Stops as endogenous responses to aggregate shocks. Households face non-insurable idiosyncratic labor and dividend income shocks. In a version of the model calibrated to an emerging economy that can explain Sudden Stops' key stylized facts, the dampening effect dominates, and Sudden Stop episodes are less severe in heterogeneous-agents economies. Consumption drops one-third and asset prices drop one-tenth of the drop obtained in the representative-agent (RA) version of the model. In contrast to the RA framework, the model produces an empirically plausible leverage ratio distribution and generates persistent current account reversals. Moreover, calibrating the model to an advanced economy where the dividend risk is 50% of the benchmark emerging-markets model, larger debt positions are supported and Sudden Stop crises are less severe, as observed in the data.

"*FDI and Sudden Stops in Small Open Economies*".

Presentations: Macro Financial Modelling Summer Session at Cape Cod (2018), Latin American Meeting of the Econometric Society at Guayaquil (2018), European Meeting of the Econometric Society at Naples (2018).
Abstract: Sudden Stops of capital inflows are not a phenomenon exclusive to emerging economies. However, the underlying factors are not necessarily the same across countries. While advanced economies invest and receive investments from abroad, most emerging economies only receive foreign investments. These differences motivate the study of the components of capital flows in both types of economies to understand better why the probability of having a Sudden Stop in an emerging economy is larger than in advanced economies. Decomposing the Financial Account uncovers important differences between advanced and emerging economies in their FDI account. First, advanced economies have, on average, zero net FDI flows as a percentage of GDP, and second, advanced economies have sufficient FDI outflows that act as buffer savings during Sudden Stops. To quantify the effect of the FDI channel on the probability of a Sudden Stop, we propose a small-open-economy model with an endogenous occasionally-binding constraint with foreign investment subject to expropriation risk in emerging economies. We calibrate the model using data for a large sample of advanced and emerging economies and find that the FDI channel has a large impact on the probability of a Sudden Stop. In particular, the model predicts that, on average, an emerging economy that increases their capital to GDP ratio and eliminates the expropriation risk would reduce the probability of a Sudden Stop from 2.9 to 1.3 percent and would increase its debt-to-income ratio from 35 to 51 percent.

"*Piecewise Linear Approximations and Filtering for DSGE Models with Occasionally-Binding Constraints*",
R&R at **Review of Economic Dynamics**. (with Boragan Aruoba, Pablo Cuba-Borda, Kenji Higa-Flores and Frank Schorfheide)

Abstract: We develop an algorithm to construct approximate decision rules that are piecewise-linear and continuous for DSGE models with an occasionally binding constraint. The functional form of the decision rules allows us to derive a conditionally optimal particle filter (COPF) for the evaluation of the likelihood function that exploits the structure of the solution. We document the accuracy of the likelihood approximation and embed it into a particle Markov chain Monte Carlo algorithm to conduct Bayesian estimation. Compared with a standard bootstrap particle filter, the COPF significantly reduces the persistence of the Markov chain, improves the accuracy of Monte Carlo approximations of posterior moments, and drastically speeds up computations. We use the techniques to estimate a small-scale DSGE model to assess the effects of the government spending portion of the American Recovery and Reinvestment Act in 2009 when interest rates reached the zero lower bound.

"*SVARs with Occasionally-Binding Constraints*", Revision requested **Journal of Econometrics**. (with Boragan Aruoba and Frank Schorfheide)

Abstract: We develop a structural VAR in which an occasionally-binding constraint generates censoring of one of the dependent variables. Once the censoring mechanism is triggered, we allow some of the coefficients for the remaining variables to change. By imposing that the regression functions are continuous at the censoring point, we can show that under some mild parameter restrictions delivers a unique reduced form. In our application the occasionally-binding constraint is the effective lower bound (ELB) on nominal interest rates. According to our estimates based on U.S. data, once the ELB becomes binding, in addition to the censoring of the nominal interest rate, the coefficients in the inflation equation change. This coefficient switch translates into a change of the inflation responses to (unconventional) monetary policy shocks and demand shocks. Our results suggest that the presence of the ELB is indeed empirically relevant for the propagation of shocks.

"*Optimal Taxes on Capital in the OLG Model with Uninsurable Idiosyncratic Income Risk*", R&R at **Journal of Public Economics**. (with Dirk Krueger and Alexander Ludwig)

Abstract: We characterize the optimal linear tax on capital in an Overlapping Generations model with two period lived households facing uninsurable idiosyncratic labor income risk. The Ramsey government internalizes the general equilibrium effects of private precautionary saving on factor prices. For logarithmic utility a complete analytical solution of the Ramsey problem exhibits an optimal aggregate saving rate that is independent of income risk, whereas the optimal time-invariant tax on capital implementing this saving rate is increasing in income risk. The optimal saving rate is constant along the transition and its sign depends on the magnitude of risk and on the Pareto weight of future generations. If the Ramsey tax rate that maximizes steady state utility is positive, then implementing this tax rate permanently induces a Pareto-improving transition even if the initial equilibrium is dynamically efficient. For general Epstein-Zin-Weil utility we show that the optimal steady state saving rate is increasing in income risk if and only if the intertemporal elasticity of substitution is smaller than 1.

Research Papers in Progress:

"*Changing Jobs to Fight Inflation: Labor Market Reactions to Inflationary Shocks*". (with Gorkem Bostanci and Omer Koru)

"*Rising Intangibles and Fading Listed*". (with Sara Casella and Hanbaek Lee)

Languages:

Spanish (native), English (fluent), French (basic).

Computational Skills:

Advanced: Julia, Matlab, Stata, R. Intermediate: Python, C++.