

Research and Scholarship Statement

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I am an applied macroeconomist whose research focuses on the housing market and its interaction with the macroeconomy. My research tends to combine empirical analysis with a focus on identification of macro-relevant parameters with macroeconomic models, although some papers have been primarily empirical and others primarily applied theory. My work also strives to inform public policy. My vitae can be divided into four broad areas.

I. Understanding House Price Dynamics and the Recent Housing Boom-Bust

The first strand of my research studies house price dynamics with a particular application to understanding the recent housing boom and bust. These papers combine carefully-identified empirical results with theory to shed light on macro questions and are emblematic of my desire to blend these two approaches.

“**House Price Momentum and Strategic Complementarity**” (*Journal of Political Economy*, 2018) evaluates a puzzle in house price dynamics: why house prices exhibit substantially more momentum, that is positive autocorrelation in price changes over two to three years, than existing theories can explain. I introduce, empirically ground, and quantitatively analyze an amplification mechanism for momentum based on concave demand that can reconcile theory with the data. Intuitively, demand is more elastic at high relative prices and inelastic at low relative prices, pushing sellers to list their house close to the average price. I identify a concave demand curve in housing micro data using a non-linear instrumental variable approach and show using a search model calibrated to the micro evidence that concave demand amplifies momentum by a factor of two to three. In doing so, I provide the first direct evidence for this type of real rigidity, which is frequently posited in the price dynamics literature.

“**How Do Foreclosures Exacerbate Housing Downturns?**” (with Tim McQuade, *Review of Economic Studies*, forthcoming) uses a structural model to show that foreclosures played a crucial role in exacerbating the recent housing bust. We introduce a dynamic search model in which foreclosures freeze the market for non-foreclosures and reduce price and sales volume by eroding lender equity, destroying the credit of potential buyers, and making buyers more selective. These effects cause price-default spirals that amplify an initial shock and help the model fit both national and cross-sectional moments better than a model without foreclosure. When calibrated to the recent bust, the model reveals that the amplification generated by foreclosures is quantitatively significant: Ruined credit and choosy buyers account for 25.4% of the total decline in non-distressed prices and lender losses account for an additional 22.6%.

“**Do Credit Conditions Move House Prices?**” (with Dan Greenwald, Working Paper) studies the extent to which an expansion and contraction of credit drive the 2000s housing boom and bust. We show that a key difference behind disparate results in the literature is the extent to which credit insensitive agents such as landlords and unconstrained savers absorb credit-driven demand, which depends on the degree of segmentation in housing markets. We develop a model which allows us to consider segmentation in between the extreme cases typically assumed in the literature. We argue that the relative elasticity of the price-to-rent ratio and homeownership with respect to an identified credit shock is a sufficient statistic for the degree of segmentation. We estimate this moment using regional variation in credit supply and use it to calibrate our model. Our structural model indicates that there is significant segmentation. Indeed, we find that credit conditions can explain between 28% and 47% of the rise in price-rent ratios in the boom.

II. The Housing Market’s Effect on Consumption, Individuals, and the Macroeconomy

The second strand of my research studies the effect of the housing markets on the macroeconomy through both its effects on consumption and on individuals. These papers tend to be mostly empirical, although some have a complementary theory section.

“**Housing Wealth Effects: The Long View**” (with Alisdair McKay, Emi Nakamura, and Jon Steinsson, *Review of Economic Studies*, forthcoming) provides new time-varying estimates of the so-called “housing wealth effect” back to the 1980s. We use three identification strategies: OLS with a rich set of controls, the Saiz housing supply elasticity instrument, and a new instrument that exploits systematic differences in city-level exposure to regional house price cycles. All three identification strategies indicate that housing wealth elasticities were if anything slightly smaller in the 2000s than in earlier time periods. This implies that the important role housing played in the boom and bust of the 2000s was due to larger price movements rather than an increase in the sensitivity of consumption to house prices. We show that these empirical results are consistent with the behavior of the housing wealth elasticity in a standard life-cycle model with borrowing constraints, uninsurable income risk, illiquid housing, and long-term mortgages for two reasons. First, low-leverage homeowners account for a substantial and stable part of the aggregate housing wealth elasticity. Second, a rightward shift in the LTV distribution not only increases the number of sensitive constrained households but also the number of insensitive underwater households.

“Making the House a Home: The Effect of Home Purchases on Consumption” (with Effraim Benmelech and Brian Melzer, *Review of Financial Studies*, R&R) introduces and quantifies a new channel through which the housing market affects household spending: the home purchase channel. Using an event study approach with rich consumption microdata, we show that households spend on average \$7,750 more on home-related durables and home improvements in the two years following a home purchase. Expenditures on nondurables and durables unrelated to the home remain unchanged or decrease modestly. The home purchase channel played a substantial role in the Great Recession, accounting for one-third of the decline in home-related durables spending and home maintenance and investment spending from 2005 to 2010.

“The Effects of Foreclosures on Homeowners, Tenants, and Landlords” (with Rebecca Diamond and Rose Tan, Working Paper) reevaluates the social costs of foreclosure, which typically focus on financial costs. Using random judge assignment instrumental variable (IV) and propensity score matching (PSM) approaches in Cook County, Illinois, we find evidence of significant non-pecuniary costs of foreclosure, particularly for foreclosed-upon homeowners. For all households (IV and PSM), foreclosure causes housing instability, reduced homeownership, and financial distress. For marginal homeowners (IV) but not average homeowners (PSM), foreclosure also causes moves to worse neighborhoods and elevated divorce. We show that the difference between IV and PSM is due to treatment effect heterogeneity: marginal homeowners have more to lose than average homeowners. We find similar financial costs for landlords, although the non-financial effects we find for owners are absent. We find few negative effects for renters. Our estimates imply that foreclosure is far more costly than current estimates imply, particularly for marginal cases that are most responsive to foreclosure mitigation policies, and that the costs are disproportionately borne by owners who lose their home.

Finally, **“What Can We Learn From Cross-Regional Empirical Estimates in Macroeconomics?”** (with Alisdair McKay, Emi Nakamura, and Jon Steinsson, *NBER Macro Annual*, forthcoming) proposes an approach for recovering estimates of partial equilibrium effects from cross-regional empirical estimates, which are contaminated by local general equilibrium effects. The basic idea is to divide the cross-sectional estimate by an estimate of the local fiscal multiplier, which measures the strength of local general equilibrium amplification. We derive conditions under which the adjustment is exact and evaluate its accuracy in a richer general equilibrium model.

III. Macroprudential Housing Policy

The third strand of my research studies macroprudential housing policies that stabilize the housing market and mitigate housing busts. This research tends to be more theoretical since it considers counterfactual policies.

“Mortgage Design in an Equilibrium Model of the Housing Market” (with Arvind Krishnamurthy and Tim McQuade, *Journal of Finance*, forthcoming) studies how mortgages can be redesigned to reduce macro volatility and default. We address this question using a quantitative equilibrium lifecycle model with aggregate shocks, long-term mortgages, and an equilibrium housing market. Designs with counter-cyclical payments outperform fixed payments, and the benefits are quantitatively significant. Among those, designs that front-load payment reductions in recessions outperform those that spread relief over the full term. Front-loading alleviates liquidity constraints when they bind most, reducing default, stimulating housing demand, and ameliorating a price-default spiral. To isolate this channel, we compare an FRM with a built-in option to be converted to an ARM with an FRM with an option to be refinanced at the prevailing FRM rate. Under these two contracts, the present value of a lender's loan falls by roughly an equal amount, but the FRM that can be converted to an ARM, which front loads payment reductions, reduces the declines in prices and consumption six times as much and reduces default three times as much.

“How Do Foreclosures Exacerbate Housing Downturns?” discussed previously, also uses a structural model to study foreclosure mitigation policy. We find that principal reduction is less cost effective than lender equity injections or introducing a single seller that holds foreclosures off the market until demand rebounds. We also show that policies that slow down the pace of foreclosures can be counterproductive.

IV. Labor Supply

Although most of my research focuses on the housing market, I have also studied extensive margin labor supply. **“Does Indivisible Labor Explain the Difference Between Micro and Macro Elasticities? A Meta-Analysis of Extensive Margin Elasticities”** (with Raj Chetty, Day Manoli, and Andrea Weber, *NBER Macro Annual*, 2013) evaluates whether existing calibrations of macro models with extensive margin labor supply are consistent with micro evidence. To do so, we use a standard calibrated macro model to simulate the impacts of tax policy changes on labor supply and also present a meta-analysis of quasi-experimental estimates of extensive margin elasticities. We find that micro estimates are consistent with macro evidence on the steady-state (Hicksian) elasticities. However, micro estimates of extensive-margin elasticities are an order of magnitude smaller than the values needed to explain business cycle fluctuations in aggregate hours. Hence, indivisible labor supply does not explain the large gap between micro and macro estimates of intertemporal substitution (Frisch) elasticities.