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What Can Housing Markets Teach Us about Economics?

Johannes Stroebel

Housing is a unique asset. Both an investment and a consumption good, it is traded in markets that are subject to significant search frictions and information asymmetries. In addition, housing accounts for a large share of wealth in the economy. As a result, changes in house prices can have large effects on aggregate economic activity. In combination with the availability of excellent data, we have large effects on aggregate economic activity. In combination with the availability of excellent data, we have large effects on aggregate economic activity.

Housing and Long-Run Discount Rates

Long-run discount rates play a central role in economics and public policy. For example, decisions about how much to invest in climate change abatement depend crucially on the trade-off between the immediate costs and the very long-term benefits of efforts to reduce global warming. Yet, despite their importance, there are few, if any, reliable estimates of the discount rates households attach to payoffs that accrue over horizons exceeding 30 years. This is, in large parts, due to the absence of reliable, long-maturity assets necessary to estimate these discount rates.

In a set of papers with Stefano Giglio and Matteo Maggiori, I take advantage of a unique feature of housing markets in the UK and Singapore to provide direct estimates of long-run discount rates for housing cash flows that materialize hundreds of years in the future. In both countries, property ownership takes the form of either a leasehold or a freehold. Leaseholds are temporary, pre-paid, and tradeable ownership contracts with initial maturities ranging from 99 to 999 years, while freeholds are perpetual ownership contracts. This contract structure allows us to infer households’ maturity-specific valuations of cash flows over horizons spanning hundreds of years. In particular, the price difference between leaseholds and freeholds for otherwise identical properties captures the present value of perpetual rental income starting at leasehold expiry, and is thus informative about households’ discount rates over extremely long and previously unexplored horizons.

We estimate the price difference between leaseholds and freeholds of different maturities with hedonic regressions, using data on the universe of housing transactions and associated property characteristics since 1994. Our findings show that, in both the UK and Singapore, 100-year leaseholds are valued at 10 to 15 percent less than otherwise identical freeholds, while the price difference is smaller for leaseholds with higher maturities, and goes to zero for leaseholds with remaining maturities of 700 years or more. Figure 1 shows the term-structure of leasehold discounts for the United Kingdom.

Leasehold Discounts Relative to Freeholds

Apartments sold in England and Wales, 2004–2013

Figure 1

Johannes Stroebel is a faculty research fellow in the NBER’s Asset Pricing, Corporate Finance, and Economic Fluctuations and Growth programs, and an associate professor of finance at New York University’s Stern School of Business. He is also the director of the Household Finance program at NYU’s Salomon Center for the Study of Financial Institutions. Before joining NYU in 2013, he was the Neuberger Family Assistant Professor of Economics at Chicago Booth.

Stroebel conducts research across a number of topics in finance and macroeconomics, with a particular focus on understanding consumer and firm behavior in housing and credit markets. More generally, he enjoys analyzing large micro datasets.

In 2012, Stroebel earned a Ph.D. in economics from Stanford University, where he held the Bradley and Kohlhagen Fellowships at the Stanford Institute for Economic Policy Research. Before that, he read philosophy, politics and economics at Merton College, Oxford, where he won the Hicks and Webb Medley Prize for the best performance in economics.

A native of Darmstadt, Germany, Stroebel lives in New York City with his wife and one-year-old son, Konrad.
We show that these price discounts of leaseholds are not driven by institutional features of the contracts. We also introduce a large dataset on retail prices to show that, conditional on observable control variables, leaseholds of different maturities and freeholds trade at similar prices. This suggests that differences in unobservable property characteristics across leaseholds and freeholds do not confound our findings. Interpretation of our results is that households attach a relatively high value to housing cash flows arising far in the future. This implies that their corresponding discount rates have to be low — according to our calculations, below 2.6 percent for housing cash flows more than 100 years in the future.

In related work together with Andreas Weber, we explore the implications of these findings for the appropriate discount rates to value investments in climate change abatement. We begin by providing new empirical evidence on the shape of the rate term structure for housing discount rates. In particular, we find the average return to real estate to be above 6 percent. In combination with the low 80-year discount rate estimated above, this implies that the term structure of housing discount rates is steeply downward-sloping. This condition requires the house price payment occurring infinitely far in the future to be zero. Such a bubble is often called a classic rational bubble. Other, more behavioral models of bubbles do not require this condition. These differences are not of merely theoretical interest: the prediction that prices of models with bubbles depend crucially on precise definition of the type of bubble under consideration. Despite this, the challenge to detect bubble effects for houses have prevented an empirically driven narrowing of the set of bubbles under consideration.

In work with Giglio and Maggiori, I study the leasehold-freehold contract set described above to provide a direct test of the classic rational bubble contract. I analyze the effects of social interactions on individuals’ housing market expectations. In this blog, I discuss such investments to better understand how local housing supply elasticity is a key driver of disagreement about the value of housing assets. They also show that social interactions can play an important role in propagating house price shocks across different regions: a fundamental demand shock in one part of the United States might make people in other regions more optimistic and drive up house prices in those regions, purely as a result of increased speculative demand.

In the absence of rational bubbles, changes in local costs. We then argue for a causal response by exploiting the local housing supply elasticity to instrument for house price changes, and by showing that the response differs by the local homeownership rate. In areas with many homeowners, higher house prices are expected to lead to higher retail prices, while in areas with few homeowners, we find, if anything, a negative response. We provide evidence that changes in local house price responses are driven by changes in markups rather than by changes in local costs. We then argue that markups rise with house prices, particularly in high homeownership locations, because greater housing wealth reduces homeowners’ demand elasticity, and firms raise markups in response. Data from Nielsen Homescan provides further evidence for this explanation. The paper shows that if house price increases cause homeowners to spend more, and to buy fewer goods on sale or with a coupon; we find the opposite effect. We then take a technical approach to understand the role of the social networks in economic and social decision making. Indeed, my research suggests the potential of using newly emerging data from online social networks to help overcome the challenges of this type of work. In ongoing research with various coauthors, I continue to use data from Facebook to analyze the effect of social interactions on a broad range of outcomes, from mortgage refinancing, to the adoption of new products, to patent citations and migration.

**House Prices and Consumer Demand**

In the United States, housing is the largest asset of most households. Consequently, variation in house prices can create large shocks to households’ wealth, and, through home equity extraction, to households’ liquidity position. An emerging literature has started to explore the effects of changes in house prices on household consumption behavior and real economic activity. In joint work with Joseph Vavra, I contribute to this research effort, and study cross-sectional variation in house price movements to better understand how local retail prices and markups respond to local demand shocks. This research of markups to demand shocks provides a key amplification mechanism in many New Keynesian macro models, but evidence on the cyclicality of markups from aggregate time-series data has proved inconclusive.

We use a large dataset of retail store scanner data to construct local retail price indices at the zip code and Metropolitan Statistical Area (MSA) levels. We then show that local retail prices respond to local house price movements. For example, Figure 2 shows that there is a strong association between the retail price level between 2001 and 2011 in MSAs that were in the top versus the bottom quintile of house price growth over the period 2001-2012. This analysis uncovers elasticities of retail prices to house prices of about 15 to 20 percent across housing booms and busts. We argue for a causal response by exploiting the local housing supply elasticity to instrument for house price changes, and by showing that the response differs by the local homeownership rate. In areas with many homeowners, higher house prices are expected to lead to higher retail prices, while in areas with few homeowners, we find, if anything, a negative response. We provide evidence that the change in local house price responses are driven by changes in markups rather than by changes in local costs. We then argue that markups rise with house prices, particularly in high homeownership locations, because greater housing wealth reduces homeowners’ demand elasticity, and firms raise markups in response. Data from Nielsen Homescan provides further evidence for this explanation. The paper shows that if house price increases cause homeowners to spend more, and to buy fewer goods on sale or with a coupon; we find the opposite effect.
sensitive and firms respond by raising markups and prices. We hope that follow-on research to include this mechanism in business cycle models will allow researchers to better match inflation patterns in the data.

Information and Search Frictions in Housing Markets

Asymmetric information is a pervasive feature of many asset and credit markets. However, testing the empirical implications of models with asymmetric information is often challenging because of the difficulties in observing the identities of different trading parties, as well as their relative information sets. In the U.S., details about housing transactions, including the identity of buyers, sellers, and lenders, is public information. I exploit the availability of these data in a number of research papers to better understand the role of asymmetric information in housing and mortgage markets.

In the first project, I empirically analyze credit market outcomes when competing mortgage lenders are differentially informed about the expected return on a loan. 1 I study the residential mortgage market where property developers often cooperate with vertically-integrated mortgage lenders to offer financing to buyers of new homes. These integrated lenders might have more information about both the value of the mortgage collateral and borrower characteristics. By conditioning on their interest rate offers on such superior information, integrated lenders can attract more risk-averse buyers.

Monika Piazzesi, Martin Schneider, and I empirically examine the consumer responses to integrated lenders’ better offers on such superior information. We find that prospective buyers do not know ex ante which houses will maximize their utility. As a result, buyers and sellers might search for high-quality matches. This search friction can have quantitative effects on equilibrium housing market outcomes.

In a related project, Pablo Kurlat and I study equilibrium outcomes in housing markets with asymmetric information among both buyers and sellers. 2 We document that hard-to-observe neighborhood characteristics are a key source of information heterogeneity in housing markets. Sellers are usually better informed about neighborhood values than buyers, but there are some sellers and some buyers who are better informed than others. To empirically test the effects of such information asymmetry, we combine data on all housing transactions in Los Angeles County since 1994, including the identities of home buyers and sellers, with information on all real estate licenses issued in Los Angeles County. We propose that real estate agents are better informed than other households about matters such as neighborhood-level demographic trends.

We propose a new search model with many segments and heterogeneous searchers to capture the interaction of broad and narrow searchers within and across segments. This model, while high-dimensional, can be estimated given our data: it shows how market activity at different levels of aggregation depends on the interaction of heterogeneous clienteles. For example, this model can explain the difference in slopes of Beveridge curves computed within cities over time, and across cities at a point in time. Within a city over time, there are “broad searchers” who are willing to buy in a given area should new inventory come on the market. This causes those segments within that city that have more inventory to attract more search activity. Across cities, however, there is variation in which cities are attractive on various dimensions. Those cities that are less attractive see less search activity and generally also have more inventory sitting on the market. The model is also informative about the transmission of shocks across segments, which depends on the presence of households that search across two segments and therefore connect them. It also shows how search frictions induce significant liquidity discounts in house prices that vary widely across market segments.

Consistent with theoretical predictions, we find that changes in the seller composition toward more informed sellers and sellers with a greater elasticity of sale predict subsequent house-price declines and demographic changes in a neighborhood. This effect is larger for houses whose value depends more on neighborhood characteristics, and smaller for houses bought by more informed buyers. Our findings suggest that homeowners have superior information about important neighborhood characteristics, and exploit this information to time local market movements.

A second major friction in housing markets derives from the heterogeneous nature of different houses, which means that prospective buyers do not know ex ante which houses will maximize their utility. As a result, buyers and sellers might search for high-quality matches. This search friction can have quantitatively important effects on equilibrium housing market outcomes.

From a policy perspective, the identification of collateral values as a key source of asymmetric information in mortgage lending helps to develop and assess policy proposals to improve the functioning of this market. In particular, a stronger focus on providing independent and reliable property assessments to all market participants might play an important role in mitigating the impact of asymmetric information.

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We use a novel dataset on online housing search from the online real estate website Trulia to measure buyer search ranges for the San Francisco Bay Area. We use these data to split the Bay Area into 76 unique market segments along the dimensions suggested by the search queries, and represent each search query as the subset of the market that the searcher is interested in. We identify over 10,000 unique search patterns within our data. We then analyze the cross-section of turnover, inventory, and search activity across our segments, and relate these measures of market activity to the observed housing search behavior. We find, for example, that search activity and inventory co-vary positively within cities and zip codes, but negatively across those units.


