# Price Uncertainty and Returns to Housing

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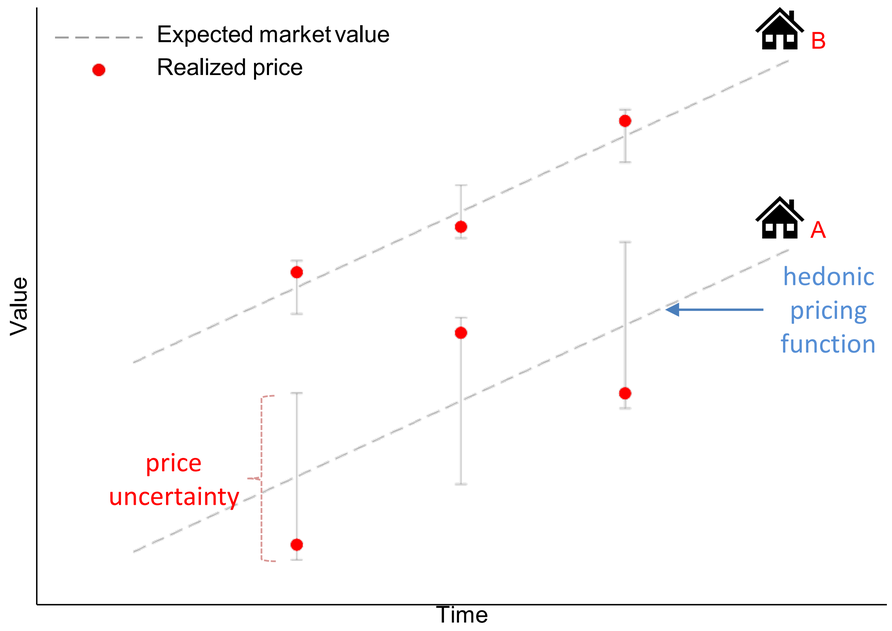
Website

Paper

## Motivation

- We know how location, credit and other factors influence housing prices
- Yet, we do not know how **price uncertainty** affects prices & returns

## Definition: Price Uncertainty




- **Conceptually** Expected variance of distribution from which price is drawn
- **Empirically** Predicted variance of pricing errors from hedonic housing price model (Jiang and Zhang, 2023)

## Research Questions

1. To what extent is price uncertainty priced in housing markets?
2. What is driving price uncertainty in housing markets?

## Data & Background

- **Source** New data set, universe of real estate transactions in German cities over the last 40 years, incl. rental income (Amaral et al., 2023)
- **Sample** Berlin, Cologne, Hamburg, Duesseldorf (420k transactions)

- **Setting** Market for apartments
- **Liquidity** Apartment rental market is larger and more liquid than the sales market

## Empirical Strategy

Transaction-level regressions:

$$outcome_{i,tq} = \gamma \hat{\sigma}_{i,tq} + B_X X_i + \kappa_{n,ty} + \eta_{tm} + \epsilon_{i,ty} \quad (1)$$

$outcome \in$ {sales price, rental yield, capital gain, total return}

$\hat{\sigma}_{i,tq}$ – price uncertainty of property $i$ in quarter $tq$

$X_i$ – vector of apartment $i$ characteristics, size and age

$\kappa_{n,ty}$ – neighborhood-year FEs

$\eta_{tm}$ – year-month FEs

Use repeat-sales to measure total returns at property level:

$$\text{Total housing return}_{i,j} = \underbrace{\frac{P_{i,t+j} - P_{i,t}}{P_{i,t}}}_{\textbf{Capital Gain}} + \underbrace{\frac{R_{i,t}(1-c)}{P_{i,t}}}_{\textbf{Net Rental Yield}} \quad (2)$$

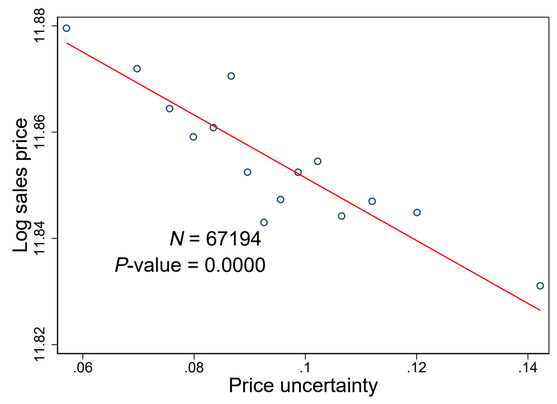
$P_t$ – apartment price in $t$

$R_t$ – rent payment in $t$

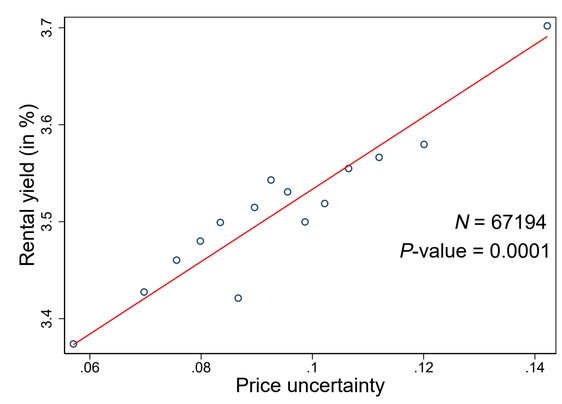
$c$ – costs as share of rent

## Higher price uncertainty → lower prices & higher returns

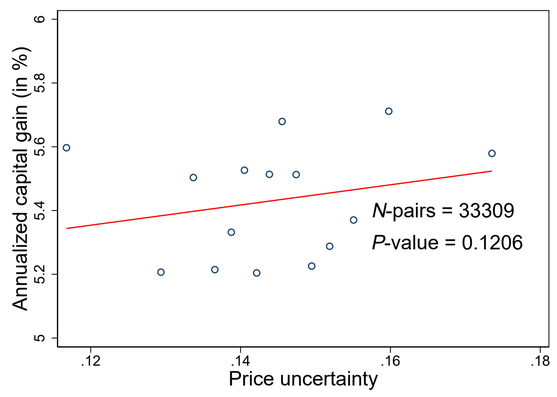
$\Delta^+$ price uncertainty → $\Delta^-$ sales prices



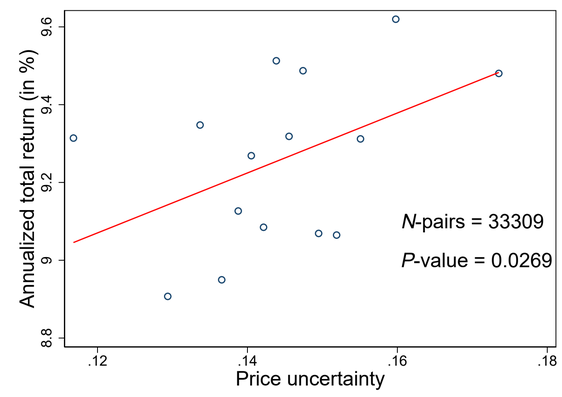

$\Delta^+$ price uncertainty → $\Delta^+$ rental yields




$\Delta^+$ price uncertainty → $\Delta^0$ capital gains




$\Delta^+$ price uncertainty → $\Delta^+$ total returns




Note: Binscatters of outcomes on price uncertainty based on regression (1). Data is for Berlin (1984-2022).

**R1** Higher price uncertainty → $6\%$ lower sales prices ✓

≈ foreclosure discounts

**R2** Higher price uncertainty → $50$ b.p. annual total return premium ✓

≈ $1/10$ average return to housing in Germany

## Mechanism – Bargaining Model

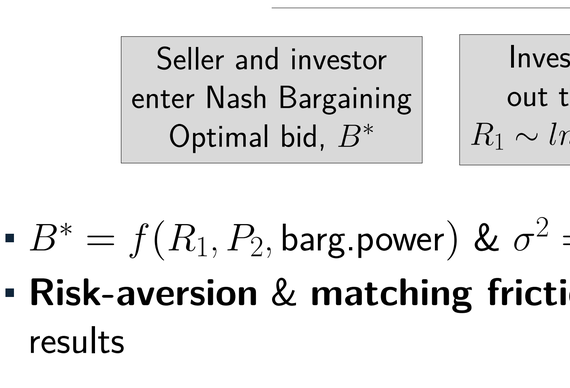
| Period 0 | Period 1 | Period 2 |
|---|---|---|
| Seller and investor enter Nash Bargaining Optimal bid, $B^*$ | Investor rents out the house $R_1 \sim ln\mathcal{N}(\mu_r, \sigma_R^2)$ | Investor sells the house $P_2 \sim ln\mathcal{N}(\mu_p, \sigma_P^2)$ |

- $B^* = f(R_1, P_2, \text{barg.power})$ & $\sigma^2 = f(\text{matching frictions})$
- **Risk-aversion** & **matching frictions** necessary to explain all empirical results

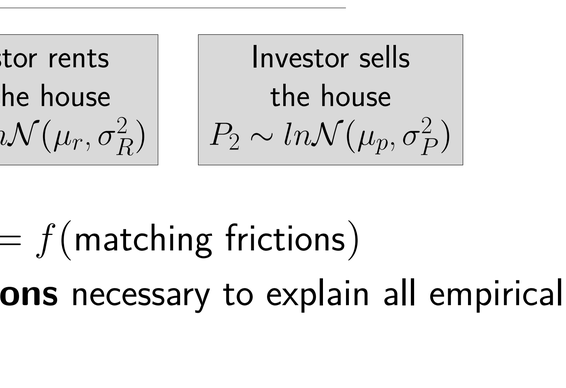
## Matching Frictions → Price Uncertainty

- Properties with higher price uncertainty are traded in **smaller** & more **illiquid** markets
- Main friction: lower number of comparable properties → higher uncertainty about the price

(a) Atypicality of apartment




(b) Spread (Ask price/Sales price)




Note: Binscatters of atypicality index (left) and asking price spread (right) on price uncertainty based on regression 1. All data is for Berlin.

## Conclusions

- Price uncertainty (*idiosyncratic risk*) is significantly priced in housing markets
- Matching frictions (*atypicality of house*) drives price uncertainty



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