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

![](image)

- 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:

\[
outcome_{i,tq} = \gamma \delta_{i,tq} + B_i X_i + \kappa_{nt} + \eta_m + \epsilon_{i,ty} \quad (1)
\]

- \(outcome \in \) (sales price, rental yield, capital gain, total return).
- \(\delta_{i,tq} \) is price uncertainty of property \(i\) in quarter \(tq\).
- \(X_i\) is vector of apartment \(i\) characteristics, size and age.
- \(\kappa_{nt}\) is neighborhood-year FEs.
- \(\eta_m\) is month-year FEs.

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

\[
R_{i,t} = \left( \frac{P_{i,t+1} - P_{i,t}}{P_{i,t}} \right) + \left( \frac{R_{i,t}(1 - c)}{P_{i,t}} \right)
\quad (2)
\]

\(P_i\) is apartment price in \(t\).
\(R_t\) is rent payment in \(t\).
\(c\) is costs as share of rent.

Higher price uncertainty \(\rightarrow\) lower prices & higher returns

\(\Delta^+\) price uncertainty \(\rightarrow\) \(\Delta^-\) sales prices;
\(\Delta^+\) price uncertainty \(\rightarrow\) \(\Delta^-\) rental yields.

\(\Delta^+\) price uncertainty \(\rightarrow\) \(\Delta^-\) capital gains;
\(\Delta^+\) price uncertainty \(\rightarrow\) \(\Delta^-\) total returns.

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

**R1** Higher price uncertainty \(\rightarrow\) 2\% lower sales prices
\(\approx\) foreclosure discounts

**R2** Higher price uncertainty \(\rightarrow\) 50 b.p. annual total return premium
\(\approx\) 1/10 average return to housing in Germany

**Mechanism – Bargaining Model**

\[B^* = f(R_t, \text{bargaining power}) \quad \text{&} \quad \sigma^2 = f(\text{matching frictions})\]

- \(B^*\) affects prices &
- Risk-aversion & matching frictions necessary to explain all empirical results.

Matching Frictions \(\rightarrow\) Price Uncertainty

- Properties with higher price uncertainty are traded in smaller & more illiquid markets.
- Main friction: lower number of comparable properties \(\rightarrow\) higher uncertainty about the price.

**Conclusions**

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

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