Price and Transaction Volume in the Dutch Housing Market

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Price-quantity correlation

• Downpayment constraints
  • Stein (QJE, 1995), Ortalo-Magné and Rady (RES, 2006)

• Search and matching
  • Wheaton (JPE, 1990), Berkovec and Goodman (REE, 1996), Krainer (JUE, 2001), Novy-Marx (REE, 2009)

• Loss aversion
  • Genesove and Mayer (QJE, 2001), Engelhardt (JUE, 2003)
Our contribution

• Go beyond simple price-quantity correlations
• Distinguish list price and sales price
• Identify flows in and out of the market
  • Rates of entry, withdrawal, sale
• Model dynamic adjustment process
  • Vector error-correction model
  • Market reaction to fundamentals (interest and unemployment)
  • Hort (RSUE, 2000), Andrew and Meen (REE, 2003)
Data

- NVM (Dutch Real Estate Agents Association)
  - 3,074,368 observations 1985-2007
  - Rich hedonic characteristics, list price, sales price, exact dating
  - Nationwide market share: 25% 1985, 60% 2007
- Variables for econometric model (monthly)
  - List price index (in logs)
  - Sales price index (in logs)
  - Rate of entry (# new dwellings for sale/all dwellings)
  - Rate of sale (# dwellings sold/dwellings for sale)
  - Unemployment rate (in logs)
  - Mortgage interest rate (in logs)
Price change versus number of sales

smoothed d(logrealtp) vs. smoothed sales (ms corrected)
Price change versus rate of sale

smoothed $d(\text{log realtp})$ vs. hazard of sale

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Data analysis

• Five series I(1)
• Rate of entry I(0)
• Three cointegrating vectors
• Exactly identified restrictions on the cointegrating vectors
Equilibrium (cointegrating) relations

• Transaction prices determined by fundamentals (unemployment and interest)

\[ tp = -0.212u - 0.312i + 0.003t \]

(13.1) \hspace{1cm} (6.3) \hspace{1cm} (13.6)

• Ratio of list price to sales price determined by fundamentals

\[ lp - tp = -0.0013u + 0.029i - 0.000t \]

(2.21) \hspace{1cm} (3.99) \hspace{1cm} (6.29)

• Rate of sales related to transaction price and interest

\[ tp = 0.492i - 1.982s + 0.005t \]

(4.08) \hspace{1cm} (20.3) \hspace{1cm} (13.5)
Impulse response functions

- Predicted dynamic responses to one-standard deviation shocks.
- Shocks identified by assuming contemporaneous structure to be recursive (Choleski decomposition).
- Recursive ordering: unemployment, interest, rate of entry, rate of sale, list price, sales price.
- Results robust to
  - Changes in ordering
  - Restrictions on cointegrating vectors.
Interest shock

Impulse shock to MRATE

Response of MRATE

Months

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Interest shock: price responses

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Interest shock: quantity response
Rate of sale (mobility) shock

- Impact on sales
- Impact on price

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Main conclusion

• Quantity leads price. Positive correlation quantity - price change during transition to new equilibrium.
  – Consistent with search and gradual dissemination of info about new equilibrium price.
  – Not obviously consistent with models driven by downpayment constraints.
hazard rates of entry, sale and withdrawal, and inventory change

1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007

-0.1 0.0 0.1 0.2 0.3 0.4 0.5

S_HAZENTRY  S_HAZSALE  S_HAZWITH  DINVENTORY
Impulse responses

Responses of

- UNEMPLOYMENT
- MRATE
- HAZENTRY
- HAZSALE
- LOGREALLP
- LOGREALTP

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