Motivation

- Social interactions might affect housing market dynamics:
  - Shiller (2008): "People were excessively optimistic about housing investments; this optimism was part of a social epidemic."
  - Little systematic empirical evidence for underlying mechanism.
Motivation

• Social interactions might affect housing market dynamics:
  • Shiller (2008): "People were excessively optimistic about housing investments; this optimism was part of a social epidemic."
  • Recent modeling advances: Burnside, Eichenbaum & Rebelo (2015).
  • Little systematic empirical evidence for underlying mechanism.

• **This Paper:** Provides empirical evidence for following story:
  1. Individuals discuss property investments with friends, and adjust their expectations based on house price experiences within social network.
  2. By influencing expectations, social interactions have a large effect on:
     i. Individual-level housing investment decisions: Extensive & intensive margin, Willingness to pay, LTV
     ii. Market-level house prices and trading volume.
Social Network Data from Facebook

- Facebook largest global and U.S. online social network
  - ~ 60% of U.S. adults regularly use Facebook.

- Observe anonymized snapshot of social graph of friendship links.
  - Average user in sample: 420 friendship links
  - >90% have met more than once in real life.

- Demographics, including county-level location.
Empirical Strategy and Data

Friends’ House Price Experiences  \[\rightarrow\] Social Interactions  \[\rightarrow\] Beliefs about Local Housing Market Investments
Empirical Strategy and Data

Friends’ House Price Experiences

Facebook Social Graph + House Price Movements in Friends’ Location

Social Interactions

Beliefs about Local Housing Market Investments

Survey on Facebook, 1,242 Responses
Friends’ House Price Experiences

\[ \text{FriendHPExp}_{i,t,t-24m} = \sum_{c} \text{ShareFriends}_{i,c} \times \Delta HP_{c,t,t-24m} \]
Friends’ House Price Experiences

\[
\text{FriendHPExp}_{i,t,t-24m} = \sum_c \text{ShareFriends}_{i,c} \times \Delta HP_{c,t,t-24m}
\]

- Example: LA resident I
Friends’ House Price Experiences

\[ \text{FriendHPExp}_{i,t,t-24m} = \sum_c \text{ShareFriends}_{i,c} \times \Delta \text{HP}_{c,t,t-24m} \]

- Example: LA resident II
Friends’ House Price Experiences

\[ \text{FriendHPExp}_{i,t,t-24m} = \sum_c \text{ShareFriends}_{i,c} \times \Delta HP_{c,t,t-24m} \]

- Example: LA resident III
Friends’ House Price Experiences

$FriendHPExp_{i,t,t-24m} = \sum_{c} ShareFriends_{i,c} \times \Delta HP_{c,t,t-24m}$
Interpretation of Friend Experiences

- Want to measure effect of friend experiences through "social interactions"
Interpretation of Friend Experiences

- Want to measure effect of friend experiences through "social interactions"

- **Concern:** Own experiences and friend experiences might be correlated
  - Many local friends $\rightarrow$ might just extrapolate from own experience.

- **Solution:** Instrument for $FriendHPExp_{i,t_1,t_2}$ with experiences of geographically-distant friends.
Friend Experiences and Housing Market Expectations

Geographically-Distant Friends’ House Price Experiences

Social Interactions

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Facebook Social Graph + House Price Movements in Friends’ Location

Survey on Facebook, 1,242 Responses
• November 2015: Target FB users through newsfeed; 1,242 responses
• Focus on a few LA zip codes; Fairly representative demographics
Housing Survey

- November 2015: Target FB users through newsfeed; 1,242 responses
- Focus on a few LA zip codes; Fairly representative demographics

How often do you talk to your friends about whether buying a house is a good investment?

- Housing investment regularly topic of discussion within social network.
Housing Survey

- November 2015: Target FB users through newsfeed; 1,242 responses
- Focus on a few LA zip codes; Fairly representative demographics

If someone had a large sum of money that they wanted to invest, would you say that relative to other possible financial investments, buying property in your zip code today is:

- A very bad investment
- A somewhat bad investment
- Neither good nor bad as an investment
- A somewhat good investment
- A very good investment

- Substantial dispersion in beliefs within the same housing market.
### Housing Survey

\[
SurveyExpectations_{i,t} = \alpha + \beta FriendHPExp_{i,t,t-24m} + \gamma X_{i,t} + \epsilon_{i,t}
\]

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Friend Appreciation 2013-15 (%)</td>
<td>0.040**</td>
<td>0.036*</td>
<td></td>
</tr>
<tr>
<td>(0.017)</td>
<td>(0.019)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friend Appreciation 2013-15 (%) x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>-0.050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.038)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Rarely</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.028)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td>0.086***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.027)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>0.096**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.049)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographic Controls</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Zip Code Fixed Effects</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Sample LA in 2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>1,242</td>
<td>1,110</td>
<td>1,242</td>
</tr>
</tbody>
</table>
Survey Expectations of Housing

\[ \text{SurveyExpectations}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma \text{X}_{i,t} + \epsilon_{i,t} \]

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<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Friend Appreciation 2013-15 (%)</td>
<td>IV</td>
<td>IV</td>
<td>IV</td>
</tr>
<tr>
<td></td>
<td>0.040**</td>
<td>0.036*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.019)</td>
<td></td>
</tr>
</tbody>
</table>

Friend Appreciation 2013-15 (%) x
Talk with Friend about Housing Investment

- **Never**: -0.050 (0.038)
- **Rarely**: 0.001 (0.028)
- **Sometimes**: 0.086*** (0.027)
- **Often**: 0.096** (0.049)

Demographic Controls: Y Y Y
Zip Code Fixed Effects: Y Y Y
Sample: LA in 2012
N: 1,242 1,110 1,242

- Larger effect of friends’ experiences when talking more about housing.
Friend Experiences and Housing Market Expectations

Geographically-Distant Friends’ House Price Experiences

Social Interactions

Beliefs about Local Housing Market Investments

Facebook Social Graph + House Price Movements in Friends’ Location

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Individual Housing Market Investments
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Facebook Social Graph + House Price Movements in Friends’ Location

1) Show Correlation
2) Argue Effect Through No Other Channel Except Expectations

Individual Housing Market Investments

LA county deeds data, 100,000s of observations
Measures of investment: Extensive Margin

\[ \text{Own}_{i,2012} = \alpha + \beta \text{FriendHPExp}_{i,2008-10} + \gamma \mathbf{X}_{i,2010} + \psi_{\text{zip}2010,\text{zip}2012} + \epsilon_i \]

- Panel of two population snapshots (renters and owners) from Acxiom: 2010 and 2012
- Focus on Los Angeles county
- Controls: Level & change in family size, income, marriage, occupation
- \( \psi_{\text{zip}2010,\text{zip}2012} \): Control for changes in geographic preferences
### Measures of investment: Extensive Margin

<table>
<thead>
<tr>
<th></th>
<th>IV: 2010 Renters</th>
<th></th>
<th>IV: 2010 Owners</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Friend Appreciation 2008-10 (%)</td>
<td>0.610***</td>
<td>0.678***</td>
<td>0.203***</td>
<td>0.223***</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.043)</td>
<td>(0.015)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Friend Appreciation 2010-12 (%)</td>
<td>0.321***</td>
<td></td>
<td>0.094***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td></td>
<td>(0.016)</td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>N</td>
<td>433,836</td>
<td>433,836</td>
<td>1,017,631</td>
<td>1,017,631</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.434</td>
<td>0.463</td>
<td>0.566</td>
<td>0.566</td>
</tr>
<tr>
<td>Mean Dependent Variable</td>
<td>17.8</td>
<td>17.8</td>
<td>93.4</td>
<td>93.4</td>
</tr>
</tbody>
</table>

- Renters: ↑ 5 ppt $\text{FriendHPE}_{i,2008-10} \rightarrow ↑ 3.1$ ppt $P(\text{Owner}_{i,2012})$
- More than 50% of the effect size of adding family member.
Measures of investment: Intensive Margin + Price Paid

- Match friend experience data to buyers in ca. 520,000 transactions since 1994:

Intensive Margin:

\[ \log(\text{PropSize}_{i,t}) = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_i + \psi_t + \epsilon_{i,t} \]

- Control for transaction quarter and buyer characteristics.
Measures of investment: Intensive Margin + Price Paid

<table>
<thead>
<tr>
<th>Model</th>
<th>IV: log(Prop Size)</th>
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</thead>
<tbody>
<tr>
<td>(1)</td>
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</tr>
</tbody>
</table>

Buyer Friend Appreciation 0.329***
Last 24 Months (%) (0.054)

Seller Friend Appreciation
Last 24 Months (%)

Controls Y
Other Fixed Effects

N 526,594
R-Squared 0.192

• ↑ 5 ppt $\text{FriendHPExp}_{i,t,t-24m} \rightarrow ↑ 1.7\% \text{ SQFT}$
Measures of investment: Intensive Margin + Price Paid

- Match friend experience data to buyers in ca. 520,000 transactions since 1994:

1. Intensive Margin:

\[
\log(\text{PropSize}_{i,t}) = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_i + \psi_t + \epsilon_{i,t}
\]

- Control for transaction quarter and buyer characteristics.

2. Transaction Price:

\[
\log(\text{Price}_{i,t}) = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_i + \phi_{zip} + \psi_t + \epsilon_{i,t}
\]

- Control for property and buyer characteristics, transaction quarter, and zip code.
## Measures of investment: Intensive Margin + Price Paid

<table>
<thead>
<tr>
<th>Model</th>
<th>IV: log(Prop Size)</th>
<th>IV: log(Price)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Buyer Friend Appreciation</td>
<td>0.329*** (0.054)</td>
</tr>
<tr>
<td></td>
<td>Last 24 Months (%)</td>
<td>0.652*** (0.039)</td>
</tr>
<tr>
<td>(2)</td>
<td>Buyer Friend Appreciation</td>
<td>0.652*** (0.039)</td>
</tr>
<tr>
<td></td>
<td>Last 24 Months (%)</td>
<td>0.564*** (0.083)</td>
</tr>
<tr>
<td>(3)</td>
<td>Buyer Friend Appreciation</td>
<td>0.564*** (0.083)</td>
</tr>
<tr>
<td></td>
<td>Last 24 Months (%)</td>
<td>0.550*** (0.125)</td>
</tr>
<tr>
<td>(4)</td>
<td>Buyer Friend Appreciation</td>
<td>0.550*** (0.125)</td>
</tr>
<tr>
<td></td>
<td>Last 24 Months (%)</td>
<td>0.652*** (0.039)</td>
</tr>
<tr>
<td>(5)</td>
<td>Seller Friend Appreciation</td>
<td>0.523*** (0.097)</td>
</tr>
<tr>
<td></td>
<td>Last 24 Months (%)</td>
<td>0.523*** (0.097)</td>
</tr>
</tbody>
</table>

- **Controls**: Y, Y, Y, Y, Y, Y, Y
- **Other Fixed Effects**: Property FE, Buyer FE

<table>
<thead>
<tr>
<th>N</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>526,594</td>
<td>0.192</td>
</tr>
<tr>
<td>523,299</td>
<td>0.791</td>
</tr>
<tr>
<td>36,892</td>
<td>0.922</td>
</tr>
<tr>
<td>35,656</td>
<td>0.915</td>
</tr>
<tr>
<td>523,299</td>
<td>0.792</td>
</tr>
</tbody>
</table>

- ↑ 5 ppt $FriendHPExp_{i,t,t-24m} \rightarrow \uparrow 3.3\%$ transaction price
Measures of investment: Loan-to-Value-Ratio

\[ LTV\ Ratio_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_i + \psi_t + \epsilon_{i,t} \]
Measures of investment: Loan-to-Value-Ratio

\[ LTV \text{Ratio}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_i + \psi_t + \epsilon_{i,t} \]

<table>
<thead>
<tr>
<th>Dependent Variable: LTV Ratio (%)</th>
</tr>
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<tbody>
<tr>
<td>(1)</td>
</tr>
<tr>
<td>Friend Appreciation (%)</td>
</tr>
<tr>
<td>Mean - Last 24 Months</td>
</tr>
<tr>
<td>(0.018)</td>
</tr>
<tr>
<td>5th pctile - Last 24 Months</td>
</tr>
<tr>
<td>(0.030)</td>
</tr>
<tr>
<td>Median - Last 24 Months</td>
</tr>
<tr>
<td>(0.101)</td>
</tr>
<tr>
<td>95th pctile - Last 24 Months</td>
</tr>
<tr>
<td>(0.060)</td>
</tr>
<tr>
<td>Month FE, Price Controls</td>
</tr>
<tr>
<td>Buyer Controls</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>R-Squared</td>
</tr>
<tr>
<td>(2)</td>
</tr>
</tbody>
</table>

• ↑ 5 ppt \text{FriendHPExp}_{i,t,t-24m} \rightarrow ↓ 1.1 ppt LTV
• Lower tail of friend experiences matters for LTV choice
Empirical Approach & Identification

\[ \text{HousingInvestment}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t} \]

- Want to argue that \( \beta \) due to effect of "social interactions" on beliefs.
Empirical Approach & Identification

\[ HousingInvestment_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t} \]

- Want to argue that \( \beta \) due to effect of "social interactions" on beliefs.
- Challenges:
  1. Geographic distribution of social network not random
Empirical Approach & Identification

\[ \text{HousingInvestment}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t} \]

• Want to argue that \( \beta \) due to effect of "social interactions" on beliefs.

• Challenges:
  1. Geographic distribution of social network not random
     • \( \text{FriendHPExp}_{i,t_1,t_2} \) essentially uncorrelated with \( X_{i,t_2} \).
     • Within-individual variation in \( \text{FriendHPExp}_{i,t_1,t_2} \).
Empirical Approach & Identification

\[ HousingInvestment_{i,t} = \alpha + \beta FriendHPExp_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t} \]

- Want to argue that \( \beta \) due to effect of "social interactions" on beliefs.
- Challenges:
  1. Geographic distribution of social network not random
  2. Common shocks to individual and her friends
Empirical Approach & Identification

\[ \text{HousingInvestment}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma \mathbf{X}_{i,t} + \psi_{t_2} + \epsilon_{i,t} \]

- Want to argue that \( \beta \) due to effect of "social interactions" on beliefs.
- Challenges:
  1. Geographic distribution of social network not random
  2. Common shocks to individual and her friends
     - \( \text{FriendHPExp}_{i,t_1,t_2} \) does not depend on behavior of friends.
     - Robust to only looking at non-geographically clustered professions (teachers, doctors, etc.)
     - Directly control for economic conditions in social network.
Empirical Approach & Identification

\[ \text{HousingInvestment}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma \mathbf{X}_{i,t} + \psi_{t_2} + \epsilon_{i,t} \]

- Want to argue that $\beta$ due to effect of "social interactions" on beliefs.
- Challenges:
  1. Geographic distribution of social network not random
  2. Common shocks to individual and her friends
  3. Consumption externalities - “Keeping up with the Joneses”
Empirical Approach & Identification

\[ HousingInvestment_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t} \]

- Want to argue that $\beta$ due to effect of "social interactions" on beliefs.
- Challenges:
  1. Geographic distribution of social network not random
  2. Common shocks to individual and her friends
  3. Consumption externalities - “Keeping up with the Joneses”
    - Directly control for housing turnover in geography social network.
    - Robust to only looking at experience of friends that are renters.
Empirical Approach & Identification

\[ \text{HousingInvestment}_{i,t} = \alpha + \beta \text{FriendHPExp}_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t} \]

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- Challenges:
  1. Geographic distribution of social network not random
  2. Common shocks to individual and her friends
  3. Consumption externalities - “Keeping up with the Joneses”
  4. Bequest and wealth effects
Empirical Approach & Identification

$$HousingInvestment_{i,t} = \alpha + \beta FriendHPExp_{i,t,t-24m} + \gamma X_{i,t} + \psi_{t2} + \epsilon_{i,t}$$

• Want to argue that $\beta$ due to effect of "social interactions" on beliefs.

• Challenges:

1. Geographic distribution of social network not random
2. Common shocks to individual and her friends
3. Consumption externalities - “Keeping up with the Joneses”
4. Bequest and wealth effects

   • Restrict to people with LA hometown or out-of-US hometown.
   • Restrict to non-family friends (e.g., college, work colleagues)
Additional Findings: Dispersion

- So far: Analyzed *average* house price experience within social network.
- Test whether dispersion of these experiences also matters.
  - Measure as 95-5 percentile range of experiences in network.
- Higher experience dispersion leads to less investment in housing market, and a lower transaction price.
Rational Behavior?

• For the message of the paper it doesn’t matter. We show that:
  • Social interactions affect housing market expectations.
  • Through affecting expectations, social interactions affect investments.
Rational Behavior?

- For the message of the paper it doesn’t matter. We show that:
  - Social interactions affect housing market expectations.
  - Through affecting expectations, social interactions affect investments.

- Hard to rule out fully rational expectations, but four thoughts:
  1. Effect is (weakly) declining in education levels.
  2. Effect is independent of the true informativeness of network house price experience for future LA house prices.
  3. Effect is independent of how many counties the friend experience is based on.
  4. House prices across the country available for free and in real time.
Where we are

1. Individuals discuss property investments with friends, and adjust their expectations based on house price experiences within social network.

2. By influencing expectations, social interactions have a large effect on individual-level housing investment decisions: Extensive & intensive margin, Willingness to pay, LTV
Where we are

1 Individuals discuss property investments with friends, and adjust their expectations based on house price experiences within social network.

2 By influencing expectations, social interactions have a large effect on individual-level housing investment decisions: Extensive & intensive margin, Willingness to pay, LTV

3 Does this aggregate up?

   • County-level friend experiences and outcomes 1998 - 2013
   • Higher dispersion → Higher trading volume, higher house price growth
   • Higher average friend experience→ Higher house price growth
County-Level Outcomes

- Analyze how average and dispersion of individual-level average social network house price experiences affected prices and trading volume.

- 831 counties; annual data between 1998 and 2013.
  - Prices and trading volume from Zillow
  - On average, we observe 53.7% of population on Facebook.
County-Level Outcomes

- Analyze how average and dispersion of individual-level average social network house price experiences affected prices and trading volume.
- 831 counties; annual data between 1998 and 2013.
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County-Level Outcomes

- Analyze how average and dispersion of individual-level average social network house price experiences affected prices and trading volume.
- 831 counties; annual data between 1998 and 2013.
  - Prices and trading volume from Zillow
  - On average, we observe 53.7% of population on Facebook.
- First analysis: Trading volume and dispersion
  - Dispersion measured as the 95-5 percentile average experience across population.
County-Level Outcomes: Trading Volume

- Exploit the panel-dimension of the data.

\[ Volume_{c,t} = \alpha_t + \psi_c + \beta_1 Disp_{c,t-1}^{all} + \beta_2 Volume_{c,t-1} + \beta_3 X_{c,t} + \epsilon_{c,t} \]

- Instrument with house price experiences of out-of-state friends.

- Lagged dependent variable captures any effect of potential common shocks to counties.

- Controls for level and change in income, unemployment rate, year-specific controls for highschool-share
### County-Level Outcomes: Trading Volume

<table>
<thead>
<tr>
<th></th>
<th>Trading Volume (% of Housing Stock)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
</tr>
<tr>
<td>Lagged Dispersion of Friend Experience (%)</td>
<td>0.168*** (0.044)</td>
</tr>
<tr>
<td></td>
<td>0.170*** (0.043)</td>
</tr>
<tr>
<td>Lagged Avg. Friend Experience (%)</td>
<td>0.015 (0.015)</td>
</tr>
<tr>
<td>Lagged Trading Volume (% of Housing Stock)</td>
<td>0.638*** (0.020)</td>
</tr>
<tr>
<td></td>
<td>0.632*** (0.022)</td>
</tr>
<tr>
<td>Lagged Change House Prices (%)</td>
<td></td>
</tr>
<tr>
<td>Fixed Effects</td>
<td>County, Year</td>
</tr>
<tr>
<td></td>
<td>Year</td>
</tr>
<tr>
<td>Controls</td>
<td>Y</td>
</tr>
<tr>
<td>Controls</td>
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<tr>
<td>N</td>
<td>10,096</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.782</td>
</tr>
</tbody>
</table>

- 1 within-county sd increase in dispersion $\rightarrow$ 0.22 sd increase in volume
County-Level Outcomes: House Price Changes

$\Delta HP_{c,t} = \alpha_t + \psi_c + \beta_1 Friend HP Exp_{c,t-1}^{all} + \beta_2 \Delta HP_{c,t-1} + \beta_3 X_{c,t} + \epsilon_{c,t}$

- Instrument with house price experiences of out-of-state friends.
- Lagged dependent variable captures any effect of potential common shocks to counties.
- Controls for level and change in income, unemployment rate, year-specific controls for highschool-share.
### County-Level Outcomes: House Price Changes

<table>
<thead>
<tr>
<th></th>
<th>Trading Volume (% of Housing Stock)</th>
<th>Change House Prices (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Lagged Dispersion of Friend Experience (%)</td>
<td>0.168***</td>
<td>0.170***</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.043)</td>
</tr>
<tr>
<td>Lagged Avg. Friend Experience (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Trading Volume (% of Housing Stock)</td>
<td>0.638***</td>
<td>0.632***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Lagged Change House Prices (%)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fixed Effects</td>
<td>County, Year</td>
<td>County, Year</td>
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<tr>
<td>Controls</td>
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</tr>
</tbody>
</table>

- Higher average experience and more dispersed experience → faster price growth. [Harrison & Kreps (1978), Scheinkman & Xiong (2003), Simsek (2010)].
Story I hope to have convinced you of

① Individuals discuss property investments with friends, and adjust their expectations based on house price experiences within social network.

② By influencing expectations, social interactions have a large effect on:

   i. Individual-level housing investment decisions:
      - Extensive & intensive margin
      - Willingness to pay

   ii. Market-level house prices and trading volume.

Contributions:
→ Social networks important for transmitting beliefs.
→ New methodology to analyze role of expectations in housing markets
→ Empirical support for models of expectation heterogeneity
Contribution

- How do individuals form expectations in financial markets?

  - Existing evidence that individuals extrapolate from own past experience:

  - **Our Contribution**: Individuals’ expectations are also affected by the recent experiences in their social networks.
    - Can induce expectation *heterogeneity* within a market.

- View that social dynamics might influence financial decisions not new:

  - **Our Contribution**: Empirical evidence for the quantitative importance of social dynamics in housing markets.
Contribution

• How do individuals form expectations in financial markets?
  
  • Existing evidence that individuals extrapolate from own past experience: Vissing-Jorgensen, 2003; Kaustia & Knuepfer, 2008; Greenwood & Shleifer, 2014; Malmendier & Nagel, 2015; Kuchler & Zafar, 2015

  • **Our Contribution**: Individuals’ expectations are also affected by the recent experiences in their social networks.
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• View that social dynamics might influence financial decisions not new:
  


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Contribution

- **New methodology** to analyze role of expectations in housing markets
  - Use house price experiences in individuals’ social networks as plausibly exogenous shifters of their expectations
  - Can be calculated at arbitrary frequency, only need geographic distribution of friendship networks.

General Theories:

Applied to Housing Markets:
Contribution

- **New methodology** to analyze role of expectations in housing markets
  - Use house price experiences in individuals’ social networks as plausibly exogenous shifters of their expectations
  - Can be calculated at arbitrary frequency, only need geographic distribution of friendship networks.

- **Empirical support for models** in which expectation heterogeneity influences asset valuation and motivates individuals to trade.
  - **General Theories:** Miller, 1977; Harrison & Kreps, 1978; Varian, 1989; Hong & Stein, 1999, 2007; Scheinkman & Xiong, 2003; Geanakoplos, 2009; Simsek, 2013a,b; Brunnermeier, Simsek & Xiong, 2014; Barberis, Greenwood, Jin & Shleifer, 2015