Is the housing market an inequality generator?

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The concept and definition of an inequality generator

- Jensen and Hansen borrow 2 and 4 mill and purchase houses at 10 and 5 mill
- Houses appreciate to 12 mill and 6 mill
- Equity: 8 to 10 (2 mill, 25 percent), 1 to 2 (1 mill, 100 percent)
- Is this indicative of inequality acceleration or deceleration?
- This article focuses attention on differences in capital gains, not size of returns
What our article does

- It studies capital gains in the Norwegian housing market
- It follows 77,554 owners from 1 Jan 2007 to 1 Jan 2019
- Panel of all individuals in 6 cohorts 1965-1990 who owned at start and in the end
- We use as dispersion metric P90 less P10, not Gini nor P90/P10
- The reason: We focus attention on purchasing power
What our article discovers

- Key finding: Large increases in our dispersion metric P90-P10
- House price changes Granger cause capital gains dispersion
- Large differences in dispersion development across cohorts and geography
- Small differences between males and females
- Dispersion development associated with income development across municipalities
Why do we care?

- Macro: Housing is the business cycle (Leamer (2007, 2015))
- Micro: Houses are the saving vehicles for most households
- Inequality is an important issue for society and contemporary debate
- Capital gains in the housing market key component of inequality
- High granularity data may inform the debate
Novelty and contribution

- Many studies of inequality of wealth, income, and consumption
- Fewer studies of dispersion of capital gains over time
- We follow panel of 77,554 owners in 6 cohorts over 12 years (2007-2019)
- We limit the influence of selection biases
- The AVM yields accurate estimates
- The AVM allows high temporal granularity (quarters)
- We employ transaction prices
Selected related literature

- Fagereng et al. (2020) Econometrica: Returns to wealth
- Aaberge et al. (2021) Statistics Norway: Income, wealth inequality and taxes (retained earnings, value of housing services, returns to assets) 2001-2018
- Benhabib and Bisin (2018) JEL: Wealth
- Benhabib et al. (2017) AER: Earnings inequality
- Attanasio and Pistaferri (2016) JEP: Consumption inequality
Substantiation and documentation

- Individual owners (single unit owners and multiple unit owners)
- No firms
- Panel consists of 77,554 owners who owned at least one housing unit on 1 January 2007 and on 1 January 2019
- 3 kinds of capital gains
  - Realized (2 transaction prices)
  - Semi-realized (1 AVM estimate, 1 transaction price)
  - Potential (2 AVM estimates)
The idea of following capital gains for a fixed panel

Example I: One-time seller and buyer

1 Jan 2007 Estimated value of owned unit → T1: Observed sell price → T2: Observed buy price → 1 Jan 2019: Estimated value of owned unit

T1: Capital gains A = Observed sell price at T1 - estimated value on 1 Jan 2007
1 Jan 2019 Capital gains B = Estimated value on 1 Jan 2019 - observed buy price at T2

Total capital gains = Capital gains A + capital gains B

Example II: Holder

1 Jan 2007 Estimated value of owned unit → 1 Jan 2019: Estimated value of owned unit

Total capital gains = Estimated value on 1 Jan 2019 + estimated value on 1 Jan 2007
## Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit (N)</th>
<th>Gini</th>
<th>P10</th>
<th>Median</th>
<th>Mean</th>
<th>P90</th>
</tr>
</thead>
<tbody>
<tr>
<td>House values Jan 1 07</td>
<td>House (75,592)</td>
<td>0.263</td>
<td>1,109,981</td>
<td>1,964,056</td>
<td>2,230,537</td>
<td>3,628,694</td>
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<tr>
<td>House values Jan 1 19</td>
<td>House (77,591)</td>
<td>0.289</td>
<td>1,908,621</td>
<td>3,536,648</td>
<td>4,117,303</td>
<td>6,866,956</td>
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<tr>
<td>Owner values Jan 1 07</td>
<td>Owner (77,554)</td>
<td>0.291</td>
<td>695,642</td>
<td>1,276,776</td>
<td>1,487,019</td>
<td>2,468,700</td>
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<tr>
<td>Owner values Jan 1 19</td>
<td>Owner (77,554)</td>
<td>0.310</td>
<td>1,208,114</td>
<td>2,249,533</td>
<td>2,710,598</td>
<td>4,641,895</td>
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<tr>
<td>Capital gains Jan 1 19</td>
<td>Owner (77,554)</td>
<td>0.310</td>
<td>421,334</td>
<td>873,137</td>
<td>1,094,006</td>
<td>1,986,294</td>
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</tbody>
</table>

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<thead>
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</thead>
<tbody>
<tr>
<td>No. of owners</td>
<td>26,697</td>
<td>24,948</td>
<td>16,793</td>
<td>7,638</td>
<td>1,406</td>
<td>72</td>
</tr>
</tbody>
</table>
Dispersion metric

- Gini coefficient and negative capital gains: Lorenz curves not defined, but techniques to compute Gini
- The ratio P90/P10 masks the difference in purchasing power between 2 mill/1 mill and 20 mill/10 mill
- The difference P90-P10 highlights the difference in purchasing power
- We show that the P90-P10 on capital gains differs from Gini on owned values
Main finding: 20 groups of 2007-owned values vs gains 2007-2019
Selected motivating results

- 80 times larger than the average monthly wage before tax
- Non-Oslo, P90: NOK 1.67 million
- Capital gains group 20 (3,048,110): 54 percent larger than group 19 (1,978,560)
- Group 19: 115 percent larger capital gains than group 10 (NOK 918,885)
Lorenz curve house values

Lorenz curves of house values. Jan 2007 and Jan 2019

Cumulative Percentage of House Values

Year
- 2007
- 2019

Gini: 0.26  Gini: 0.29
Gini indices of owner values

Units: Owners. Total value of each owner's home(s) in our dataset.
Gini index over time and P90 and P10 capital gains

Gini index of owner values over time. Not Oslo versus Oslo, 2007-2019

P90 and P10 of capital gains over time. Not Oslo versus Oslo, 2007-2019
Granger causality house price index and capital gains dispersion

Tests of Granger causality

\[ HP_t = \alpha + \beta_1 L(HP_t) + \beta_2 L(I_t) + e_t, \]
\[ I_t = \theta_0 + \theta_1 L(I_t) + \theta_2 L(HP_t) + u_t, \]
\[ HP_t = \alpha + \beta_1 L(HP_t) + e_t, \]
\[ I_t = \theta_0 + \theta_1 L(I_t) + u_t. \]

<table>
<thead>
<tr>
<th>Smoothing</th>
<th>Number of lags, F-statistic (p-value)</th>
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<tbody>
<tr>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>HP Granger-causes I</td>
<td>9.1 (0.0041)</td>
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<tr>
<td>I Granger-causes HP</td>
<td>1.1 (0.29)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No smoothing</th>
<th>Number of lags, F-statistic (p-value)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>HP Granger-causes I</td>
<td>9.5 (0.0036)</td>
</tr>
<tr>
<td>I Granger-causes HP</td>
<td>0.93 (0.34)</td>
</tr>
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</table>
Median capital gains across individuals. Within Norwegian municipalities, 2007-2019
Females vs males

P90 and P10 of capital gains over time. Not Oslo versus Oslo, 2007-2019

Sex
- F
- M

P90 and P10, Capital Gains

Time

Not Oslo
Oslo
Concluding remarks and policy implications

- We follow a panel of owners
- Cohorts 1965-1990
- Large differences in capital gains, P90-P10
- Different picture using Gini on owner values
- Some differences between males and females in high capital gains segments
- Regularities across cohorts and geography