Property Right Restriction and House Prices

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Public Housing in Singapore: Housing and Development Board (HDB)

Source: www.theonlinecitizen.com
Background of Executive Condos (ECs)

- Introduced in 1995 to address housing affordability for sandwich class
  - US$ 300,000 of mean HDB price vs. US$1 M of mean private condo price
- Eligibility for ECs
  - Income ceiling of US$10,500 vs. US$9,000 for HDB
  - Other conditions: citizenship, age, property ownership, application history, etc.
- How It Works
  - Governmental land sales
  - Lower land prices
Executive Condominiums

Source: Sol Acres EC Official Site
## Property Right Restrictions for ECs

<table>
<thead>
<tr>
<th>Minimum Occupation Period (MOP)</th>
<th>5 years from the completion before the owner can sell it in open market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rental restrictions</td>
<td>Renting out the whole EC unit within the 5-year MOP is not allowed. However, renting out of bedroom(s) is permissible.</td>
</tr>
<tr>
<td>Resale Restrictions</td>
<td>Owners can sell their EC unit to Singaporean citizens and PRs after the 5 years of occupation. Owners can sell their unit to anyone including foreigners after 10 years of occupancy.</td>
</tr>
</tbody>
</table>
Research Questions

• What is the economic impact of placing temporary restrictions on the owners’ rights to rent and sell his or her property?
  • To what extent does temporary, complete illiquidity reduce housing prices?
  • To what extent does a temporary binding constraint on foreigners’ ownership reduce housing prices?
  • When the restriction is removed, do housing prices converge back?
Literature Review

• Difficult to isolate the impact of one dimension of property rights
• Restriction of property rights (mostly to produce and use) and its impacts on house prices
  • Land use regulations (Quigley and Rosenthal 2005; Ihlanfeldt 2007; Munneke et al. 2013)
  • Restrictions on keeping pets (Lin et al. 2013)
  • Age of the occupants (Do and Grudnitski 1997; Carter et al. 2012; Allen 1997; Guntermann and Thomas 2004; Lin et al. 2010)
• Our research: Focus on the right to transfer and compare to other bundles of property rights
Literature Review

• Complete, temporary illiquidity on asset pricing
  • Mostly relied on the context of stock trading illiquidity (e.g. Bailey and Jagtiani, 1994)
  • Our research: calculate the discount for forward-start American put option for residential properties

• Place-based affordable housing policies
  • Indirect, non-economic outcomes or external effects (Rohe and Freeman, 2001; Cummings et al., 2002; Schwartz et al., 2006; Ellen and Horn, 2011)
  • Middle class/ownership often neglected (Linneman and Megbolugbe 1992)
  • Evaluate effectiveness of barring foreign buyers
Economic Intuitions: Forward Start American Put Option vs. American Put Option

- **FAP(S):** Forward Start American Put option to sell to Singaporeans
- **FAP(F):** Forward Start American Put option to sell to Foreigners

<table>
<thead>
<tr>
<th>Age of EC</th>
<th>Contract Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount in new sales associated with FAP(S)</td>
<td>No sale</td>
</tr>
<tr>
<td>Foregone discount in resales associated with FAP(S)</td>
<td>Contract Year</td>
</tr>
</tbody>
</table>

Can Sell to Singaporean Residents

Can Sell to Foreigners

<table>
<thead>
<tr>
<th>Age of private condominiums</th>
<th>Contract Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP(S): American Put option to sell to Foreigners</td>
<td>Contract Year</td>
</tr>
<tr>
<td>AP(F): American Put option to sell to Foreigners</td>
<td>Contract Year</td>
</tr>
</tbody>
</table>
Data

- Project level information from Quarterly Property Market Information
  - Published by Urban Redevelopment Authority
  - Building approval, launch, completion dates, etc.
- Sales transaction data from Real Estate Information System (REALIS)
  - Also maintained by URA
  - Sale price, transaction date, floor area, etc.
- Project amenities and construction quality
  - Propertyguru.com.sg & BCA
  - Pool, gym, tennis court, lounge, karaoke, etc.
Research Design

- Quasi-experimental approach by matching ECs transacted during 1996 and 2016 (treatment) with comparable private condominiums (comparison)
- Selection criteria for the potential comparison group
  - Leasehold only
  - Within 2km distance from ECs
  - Transacted during the same period
Research Design
Research Design
Initial Sample

- 61 EC developments comprising 32,817 units transacted between 1996 and 2016 (until June)
  - New sale and resale
  - 23 EC projects with 9,986 units have crossed the tenth year milestone.
  - 2,654 units were transacted among them.
- 53,358 units in private condominiums within a 2 km distance from ECs transacted between the same period
# Summary Statistics of the Initial Sample

<table>
<thead>
<tr>
<th>Definitions</th>
<th>All Units</th>
<th>Executive Condominiums</th>
<th>Private Condominiums</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>Transaction price (in 2014 S$)</td>
<td>803,426</td>
<td>1,456,145</td>
<td>736,019</td>
</tr>
<tr>
<td>Floor area of unit (m²)</td>
<td>110.41</td>
<td>320.75</td>
<td>115.54</td>
</tr>
<tr>
<td>Floor level of unit</td>
<td>8.37</td>
<td>5.49</td>
<td>8.51</td>
</tr>
<tr>
<td>Age</td>
<td>1.71</td>
<td>3.62</td>
<td>1.85</td>
</tr>
<tr>
<td>Distance to CBD (km)</td>
<td>14.12</td>
<td>2.61</td>
<td>15.02</td>
</tr>
<tr>
<td>Distance to subway (km)</td>
<td>0.94</td>
<td>0.55</td>
<td>1.01</td>
</tr>
<tr>
<td># of sale transactions</td>
<td>86,175</td>
<td></td>
<td>32,817</td>
</tr>
</tbody>
</table>
## Matching Quality (caliper = 0.003)

<table>
<thead>
<tr>
<th></th>
<th>Mean (Treatment)</th>
<th>Mean (Comparison)</th>
<th>% Bias</th>
<th>P-value from 2 sample t-test</th>
<th>Variance Ratio</th>
<th>Cochran’s Rule of Thumb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction year</td>
<td>2008.4</td>
<td>2008.2</td>
<td>2.4</td>
<td>0.186</td>
<td>1.24</td>
<td>pass</td>
</tr>
<tr>
<td>Completion year</td>
<td>2008.2</td>
<td>2008.2</td>
<td>0.9</td>
<td>0.309</td>
<td>1.17</td>
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<tr>
<td>Floor area of unit</td>
<td>114.1</td>
<td>112.8</td>
<td>4.3</td>
<td>0.101</td>
<td>0.33</td>
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<tr>
<td>Floor level of unit</td>
<td>8.5</td>
<td>8.5</td>
<td>-0.7</td>
<td>0.454</td>
<td>0.73</td>
<td>pass</td>
</tr>
<tr>
<td>Complex size</td>
<td>1.2</td>
<td>1.2</td>
<td>2.5</td>
<td>0.162</td>
<td>1.04</td>
<td>pass</td>
</tr>
<tr>
<td>Distance to subway</td>
<td>509.5</td>
<td>509.6</td>
<td>-0.1</td>
<td>0.940</td>
<td>1.01</td>
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<td>Distance to CBD</td>
<td>1.0</td>
<td>1.0</td>
<td>-2.2</td>
<td>0.152</td>
<td>0.79</td>
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<tr>
<td>Planning area (neighborhood)</td>
<td>14.5</td>
<td>14.5</td>
<td>1.1</td>
<td>0.221</td>
<td>1.05</td>
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<tr>
<td>No of observations</td>
<td>22,912</td>
<td>22,912</td>
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</tbody>
</table>
Matching Quality

Comparison Group: PCs

Treatment Group: ECs

Graphs by psmatch2: Treatment assignment
Projected Price Gap between ECs and Matched PCs (Using Model 2)

**Bar Chart:**
- **Age of ECs:**
  - 0: -20.8%
  - 1: -16.0%
  - 2: -12.0%
  - 3: -8.0%
  - 4: -4.0%
  - 5: 0.0%
  - 6: -4.0%
  - 7: -7.5%
  - 8: -6.0%
  - 9: -3.8%
  - 10: -2.8%
  - 11: -2.8%
  - 12: -2.8%
  - 13: -2.8%

**Note:** No sale transactions during this interval because EC owners are not allowed to sell their units within the first five years of ownership.
# Results on Simulated Option Price Values

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td></td>
<td>FAP(S)</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td>$223,095</td>
<td>$234,248</td>
<td>$238,887</td>
<td>$243,618</td>
<td>$248,442</td>
<td>$253,361</td>
<td>$253,409</td>
<td>$253,452</td>
<td>$253,488</td>
<td>$253,518</td>
<td>$253,542</td>
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<tr>
<td></td>
<td>FAP(F)</td>
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<tr>
<td></td>
<td>$202,539</td>
<td>$212,635</td>
<td>$216,833</td>
<td>$221,114</td>
<td>$225,480</td>
<td>$229,931</td>
<td>$234,471</td>
<td>$239,100</td>
<td>$243,820</td>
<td>$248,633</td>
<td>$253,542</td>
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<tr>
<td></td>
<td>Total</td>
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<td></td>
<td>$425,634</td>
<td>$446,883</td>
<td>$455,720</td>
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<td>$473,923</td>
<td>$483,293</td>
<td>$487,880</td>
<td>$492,552</td>
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<td>$502,152</td>
<td>$507,083</td>
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<table>
<thead>
<tr>
<th></th>
<th>Option Price for Private Condominiums</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>AP(S)</td>
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<tr>
<td></td>
<td>$252,927</td>
<td>$253,118</td>
<td>$253,186</td>
<td>$253,249</td>
<td>$253,308</td>
<td>$253,361</td>
<td>$253,409</td>
<td>$253,452</td>
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<tr>
<td></td>
<td>$505,855</td>
<td>$506,235</td>
<td>$506,371</td>
<td>$506,498</td>
<td>$506,615</td>
<td>$506,722</td>
<td>$506,819</td>
<td>$506,904</td>
<td>$506,976</td>
<td>$507,037</td>
<td>$507,083</td>
</tr>
</tbody>
</table>

## Option Price Differences

| Discount for ECs | -15.9% | -11.7% | -10.0% | -8.2% | -6.5% | -4.6% | -3.7% | -2.8% | -1.9% | -1.0% | 0.0% |
Robustness Checks

- Potential quality difference between ECs and private condominiums
  - Adding project amenities/construction quality scores
  - 20% initial discount and 1.5% permanent discount

- Unobserved differences and potential biases
  - Applying the bounding technique (Altonji et al. 2005; Oster 2013)
  - Bounding estimates for EC variables are much higher than the common heuristic value of 1.

- Different specification and matching methods
  - EC*YR5 & EC*YR10 only
  - Comparison group within 1 km radius
Summary of Findings

• Role of temporary restriction on transferability of property rights
  • Initially about 21% lower price (about $111,360 per EC unit)
• Role of temporary binding constraint on foreigners’ ownership (partial illiquidity)
  • Still, 8% lower price after the 5th year
• Price gap reduces to about 3% after all restrictions are removed
Discussions

• Significant, negative impact of restricting the right to transfer on property values
  • Similar to the impact of use right restrictions
• Role of partial illiquidity from temporary foreign transferability restrictions to asset pricing
  • Smaller than permanent foreign ownership restriction
• Implications for housing policy
  • EC Buyers enjoy not only living in higher quality residential units but also high price appreciation.
  • A good stepping stone for middle-income households (transitioning from HDB)