Why Are Housing Demand Curves Upwards Sloping?

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Introduction

**Figure:** Demand curve electric vehicles

- Demand is downward sloping.
This does not always hold in housing markets:
- Downpayment constraints (Genesover and Mayer, 1997)
- Nominal loss aversion (Genesover and Mayer, 2001)
- Price expectations (Dusansky and Koç, 2007)

Dusansky and Koç (2007):
- If prices go up, people expect them to go up even further.
- Microeconomic model of housing demand (two periods).
- Empirical evidence (U.S.) support their findings.
Dusansky and Koç (2007)

- Key assumption: buy in one period, sell and rent in the other.

- But what about *persistency* in homeownership status:
  - 61% of U.S. households still homeowner after 18 years even if they have moved multiple times in between. (Turner and Smith, 2009)
This paper:

- Take out price expectations, plug in persistency.

- Demand curves can be upward sloping even in the absence of downpayment constraints, nominal loss aversion, and price expectations.

- Intuition: A price increase has a wealth and a cost effect. Relative size depends on whether a household trades up or down the property ladder.

- Calibrate + regressions: Dutch housing demand survey, 2006
  - No nominal loss aversion, no downpayment constraints.
  - Three pieces of price information, including the willingness to pay for future housing.
Period 1 (standard setup):
- buy a house $x_1$ for marginal price $p_1$ using a mortgage $m_1$.
- receive income $y_1$, including some return $r_a$ on previous asset holdings $A_0$, minus the amount you pay for the house yourself, including a transaction cost factor $t \ (t>1)$ for the house, constitutes savings $s_1$.
- your assets $A_1$ are previous assets plus savings.
- housing assets $H_1$ are previous housing assets $H_0$ plus excess value in the house.
- total assets $T_1$ are non-housing assets plus housing assets.

Period 2:
- similar setup on the asset $A_2$, housing asset $H_2$ side, but...
- you sell your house $p_2x_1$ and buy a new one $p_2x_2$. 
Households maximize utility subject to an intertemporal budget constraint.

Solvings gives the Euler equation characterizing the optimal solution, and Marshallian demand for first and second period housing. Interested in second period housing choice.
What happens if prices \((p_2)\) change?

\[
\frac{\partial \bar{x}_2}{\partial p_2^*} = \frac{(t-1)\bar{x}_2 - \bar{x}_1}{|\mathbf{V}|} (t-1)p_2^*U_{x_1x_1} + \frac{\lambda}{|\mathbf{V}|} (t-1)p_2^* (p_2^* - tp_2^*)
\]

\[
= \frac{(t-1)\bar{x}_2 - \bar{x}_1}{|\mathbf{V}|} \text{Income effect} + (t-1)p_2^* (p_2^* - tp_2^*) \text{Cross-price substitution effect of a first period price decrease}
\]

\[
= -\frac{(t-1)\lambda}{|\mathbf{V}|} (p_2^* - tp_1)^2 \text{Substitution effect of a second period price increase}
\]

(Slutsky equation)

**Theorem (Upward sloping demand)**

If \((t-1)\bar{x}_2 - \bar{x}_1 < 0\), such that the income effect is positive, and the income effect outweighs the substitution effects then \(\frac{\partial \bar{x}_2}{\partial p_2^*} > 0\).

- The standard normal goods assumption is no longer sufficient to ensure that demand is downward sloping.
- The first term is negative if period one housing consumption is larger than (transaction cost adjusted) second period housing consumption.
- Whether the income effect outweighs the substitution effects is mainly an empirical question (calibration + regression).
Data

Survey

1. 25,000 homeowners
2. 75% trades up
3. Regression: Proxy for (future) housing demand

- I control for a lot of current housing characteristics and household attributes.
Assume Cobb-Douglas preferences. Plug in wealth, $W_T$, and $p_1$ and $p_2$. Vary preferences $\alpha$ and $\beta$. 

**Figure**: Slope of the demand curve
Regression results

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Trade up</th>
<th>Trade down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log (expected selling price)</td>
<td>-1.561***</td>
<td>0.414***</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.028)</td>
</tr>
<tr>
<td>Housing char.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Household char.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.229</td>
<td></td>
</tr>
<tr>
<td>Number of obs.</td>
<td>25,452</td>
<td></td>
</tr>
</tbody>
</table>

- Probit, Multinomial logit, Nested logit, *IV multinomial logit*.

- The homeowner's expected selling price of the current home, $p_2$, is endogenous, use average price per municipality (and type of house) as instrument. Show AME and bootstrapped S.E.

- A one percent increase in $p_2$ decreases the probability to move by 1.56 percentage points for the trade up group and it increases by 0.4 for the trade down group.
Broader implications and future research

**Figure:** Lifecycle and trading up or down

- Substantial literature: price-transaction volume relationship.
- Mix trade up or down determines this relationship.
- Trading up or down is related to the life cycle.
- As ageing becomes more prominent in society: stronger positive correlation.
Conclusions

- Housing demand can be upward sloping even in the absence of downpayment constraints, nominal loss aversion, and price expectations.

- Microeconomic model of housing demand with persistency in homeownership status.

- Evidence: calibrated version + regression estimates.

- Broader implications: price-transaction volume relationship.
Thank you for listening!

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