Introduction
○○○○

The model
○○○

Data
○

Results
○○○

Conclusions
○○

Why Are Housing Demand Curves Upwards Sloping?

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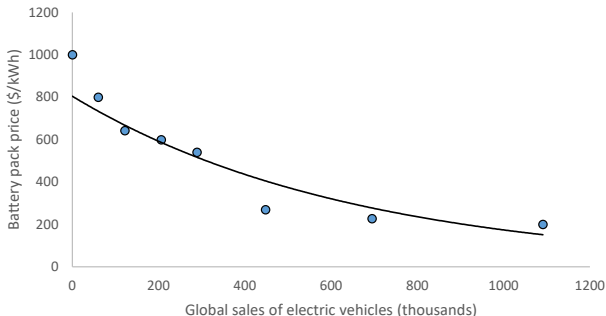
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Introduction

Figure: Demand curve electric vehicles

- Demand is downward sloping.

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Introduction

- 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).
    - Emperical 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.
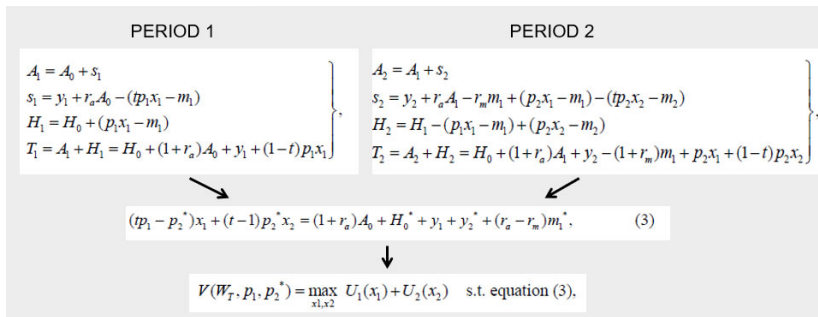   (Turner and Smith, 2009)

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.

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Introduction
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The model
●oo

Data
o

Results
ooo

Conclusions
oo

The model in words

- 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:
    - simalar setup on the asset A_2, housing asset H_2 side, but...
    - you sell your house $p_2 x_1$ and buy a new one $p_2 x_2$.

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The model in equations

PERIOD 1	PERIOD 2

$$A_1 = A_0 + s_1$$
$$s_1 = y_1 + r_a A_0 - (tp_1 x_1 - m_1)$$
$$H_1 = H_0 + (p_1 x_1 - m_1)$$
$$T_1 = A_1 + H_1 = H_0 + (1 + r_a)A_0 + y_1 + (1 - t)p_1 x_1$$

$$A_2 = A_1 + s_2$$
$$s_2 = y_2 + r_a A_1 - r_m m_1 + (p_2 x_1 - m_1) - (tp_2 x_2 - m_2)$$
$$H_2 = H_1 - (p_1 x_1 - m_1) + (p_2 x_2 - m_2)$$
$$T_2 = A_2 + H_2 = H_0 + (1 + r_a)A_1 + y_2 - (1 + r_m)m_1 + p_2 x_1 + (1 - t)p_2 x_2$$

$$(tp_1 - p_2^*)x_1 + (t - 1)p_2^* x_2 = (1 + r_a)A_0 + H_0^* + y_1 + y_2^* + (r_a - r_m)m_1^*, \qquad (3)$$

$$V(W_T, p_1, p_2^*) = \max_{x1, x2} U_1(x_1) + U_2(x_2) \quad \text{s.t. equation (3),}$$

- 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?

$$\frac{\partial \bar{x}_2}{\partial p_2^*} = \underbrace{\frac{(t-1)\bar{x}_2 - \bar{x}_1}{|J|}(t-1)p_2^* U_{x_1 x_1}}_{\substack{Income\ effect \\ +/(-)}} + \underbrace{\frac{\bar{\lambda}}{|J|}(t-1)p_2^*(p_2^* - tp_2^*)}_{\substack{Cross-price\ substitution\ effect \\ of\ a\ first\ period\ price\ decrease \\ -}}$$

(Slutsky equation)

$$\underbrace{-\frac{(t-1)\bar{\lambda}}{|J|}(p_2^* - tp_1)^2}_{\substack{Substitution\ effect\ of \\ a\ second\ period\ price\ increase \\ -}} .$$

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).

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Data

Survey

1. 25,000 homeowners

2. 75% trades up

3. Regression:
   Proxy for (future)
   housing demand

Variable	Mean	Std.dev.	p25	p50	p75
Main dependent variable					
Want to move within two years (1 if prefer to move)	0.151	0.358	0.000	0.000	0.000
Maybe want to move	0.084	0.277	0.000	0.000	0.000
Want to move, but cannot find a home	0.007	0.081	0.000	0.000	0.000
Definitely want to move	0.040	0.197	0.000	0.000	0.000
Just found a new home	0.020	0.140	0.000	0.000	0.000
Definitely do not want to move	0.849	0.358	1.000	1.000	1.000
Length of residence	13.76	11.57	5.00	10.00	20.00
Conditional on whether households want to move [a]					
Trade up? (1 if yes, preferred price – expected sale price>0)	0.748	0.434	0.000	1.000	1.000
Preferred buy price – Expected sale price (Euros)	53,103	107,494	0	50,000	100,000
Preferred buy price of the future home (Euros)	304,274	133,220	211,000	279,000	350,000
Expected sale price of the current home (Euros)	251,171	120609	175,000	222,500	295,000
Main independent variables					
Expected capital gains (log sale price expectation – log buy price)	0.917	0.727	0.293	0.810	1.319
log(Homeowner's sale price expectation)	12.45	0.44	12.18	12.43	12.74
log(Buy price current home)	11.54	0.75	11.09	11.61	12.07
Expected capital gains, (Euros)	151,749	128,753	57,228	129,706	205,580
Homeowner's expected sale price of the current home (Euros)	283,399	141,247	195,000	250,000	340,000
Buy price current home (Euros)	131,650	94,767	65,798	110,000	175,000

- I control for a lot of current housing characteristics and household attributes.
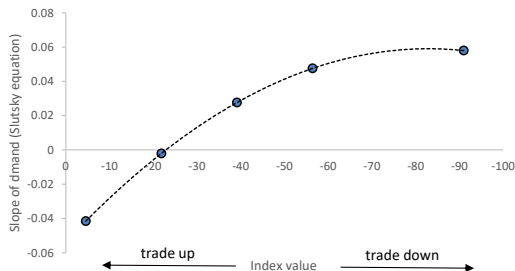
Calibration results

Figure: Slope of the demand curve

- Assume Cobb-Douglas preferences. Plug in wealth, W_T, and p_1 and p_2. Vary preferences α and β.

Regression results

Table: IV Multinomial logit
(dependent variable: want to move)

Treatments	**Trade up**	**Trade down**
Log (expected selling price)	-1.561***	0.414***
	(0.037)	(0.028)
Housing char.	Yes	
Household char.	Yes	
Pseudo R-squared	0.229	
Number of obs.	25,452	

- 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.

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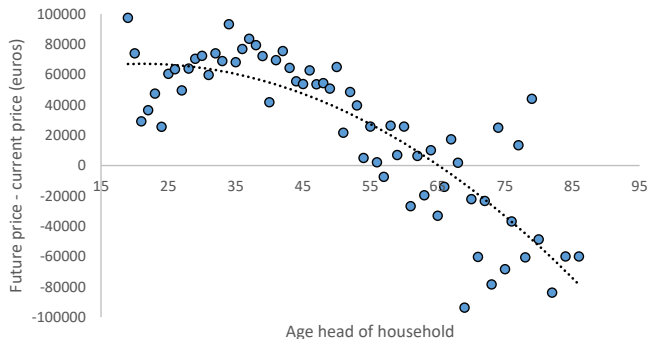
Broader implications and future research

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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