Real-Estate Investors, House Prices and Rents: Evidence from Capital-Gains Tax Changes

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Motivation

- Goal: understand role of investors in housing markets
  - "real-estate investors":= households who own 2 or more housing units
  - own a large share of the housing stock
  - primary suppliers of rental housing
- Contributed to 2000's housing boom in the US
  (Gao, Sockin & Xiong 2020, Bayer, Mangum & Roberts 2021)
- In recent years increased investors' activity (Australia, Canada, UK, US, Israel)
- Policy debate: use taxes to push investors out of the housing market?

Policy debate: tax real-estate investors?

Debate centered on affordability of housing for first-time homebuyers

- E.g., Israel's Finance Minister said 2015:

  "Some people own 2, 3, 4, units or more. [...] They need to make room for the next generation. That's why we decided to **push the investors out of the housing market**."

- Enacted two pronged approach: tax cuts on investor's capital gains to increase supply; tax hikes on investor buyers to reduce demand

Effect of tax on prices?

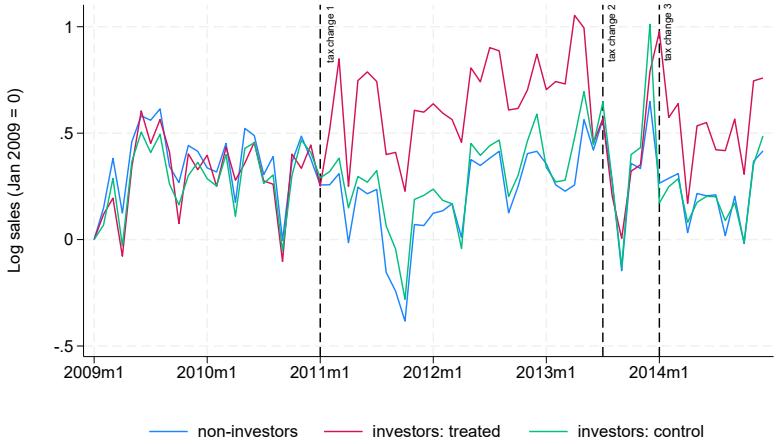
- Capital-gains tax changes investors' behavior
  1. capitalization effect: reduce present value, disincentivize buying
  2. lock-in effect: investors hold on to avoid tax, restricted supply & misallocation

- When investors exit, what happens to prices?
  - rep. household: owns or rents, user cost = rent, no effect on prices
  - heterogeneity and segmentation $\Rightarrow$ house prices $\downarrow$, rent $\uparrow$

- Only limited evidence on magnitude of price effects
  - empirical challenges: transactions, prices & rents jointly determined, driven by beliefs, difficult to disentangle capitalization and lock-in effects

Quasi experiment: capital-gains tax cut in Israel

Removed lock-in effect on some investors, small & common capitalization effect



This paper

- Data on Israeli housing market, stock, transactions, & rents, 2009-2014

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   - identification: difference-in-discontinuity, within investors
   - temp. exemption from tax increased investor sales rate by 50%

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1. How do tax changes impact investors' sales?
   - identification: difference-in-discontinuity, within investors
   - temp. exemption from tax increased investor sales rate by 50%
2. **How does investor exit affect local house prices & rents?**
   - identification: variation in investor composition across local housing markets
   - 1pp rise in sales rate (baseline 6pp) $\Rightarrow$ house prices 10% $\downarrow$, rents 5% $\uparrow$
   - policy tradeoff: pushing investors out helps home buyers, hurts renters

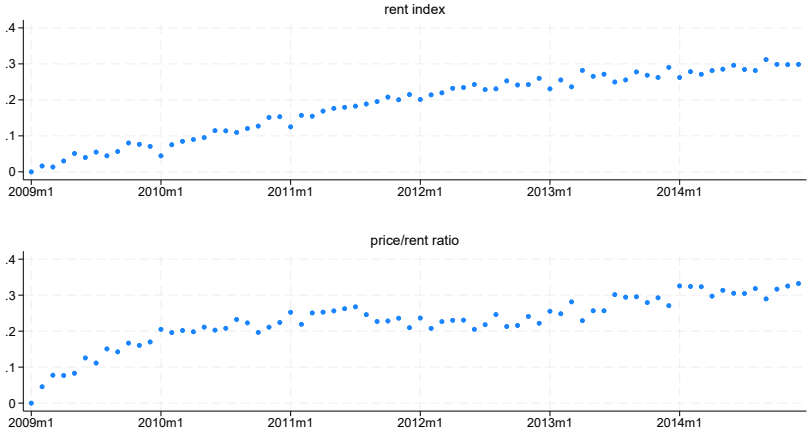
Literature

- **Transfer taxes affect housing transactions** Shan 11', Besley, Meads, & Surico 14', Kopczuk & Munroe 15', Slemrod, Weber, & Shan 17', Best & Kleven 18', Somerville, Wang, & Yang 20', Agarwal, Li, Qin, Wu & Yan 20', Han, Ngai & Sheedy 22'
  - here: focus on lock-in effect of capital gains tax on investors
- **Real-estate investors affect prices** Haughwout, Lee, Tracy, van der Klaauw 11', Chinco & Mayer 16', Albanesi, De Giorgi, & Nosal 17', Gao, Sockin, & Xiong 20', Bayer et al. 20', Bayer, Mangum & Roberts 21', Defusco, Nathanson & Zwick 22'
  - here: investor exit lowers house prices, **increases rents**
  - measure demand elasticities, highlight policy tradeoff

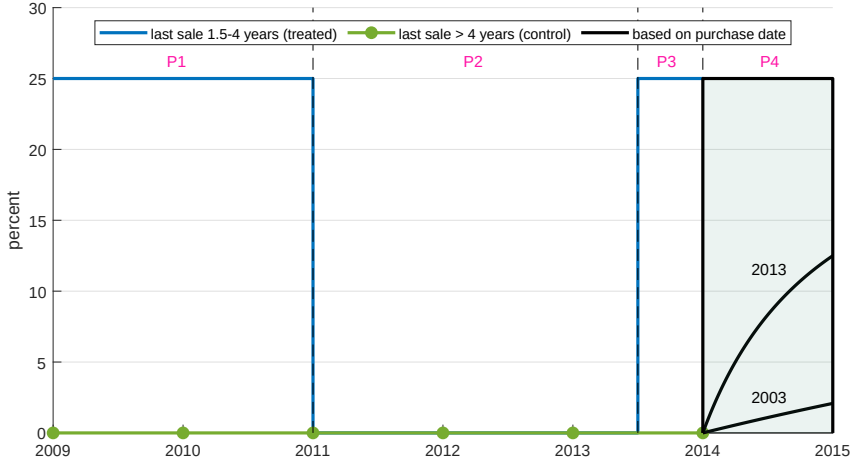
Background: Israeli housing market, 2009-2014

72% homeownership rate, 91% of rental units owned by small investors

$< 1\%$ rent control/public housing, easy to evict with cause



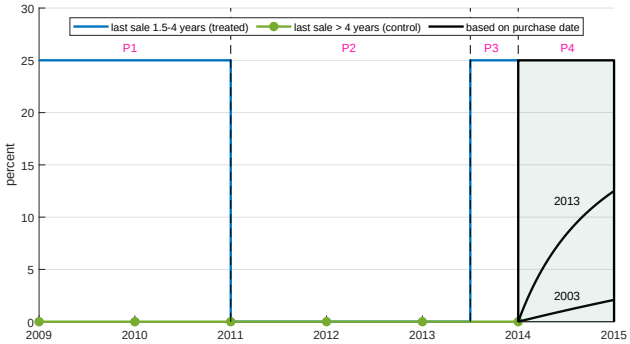
Capital-gains tax on investors



other tax reforms | Capital-gains tax payments

4 features of tax changes help identification

1. Tax cut applies only to subset of investors



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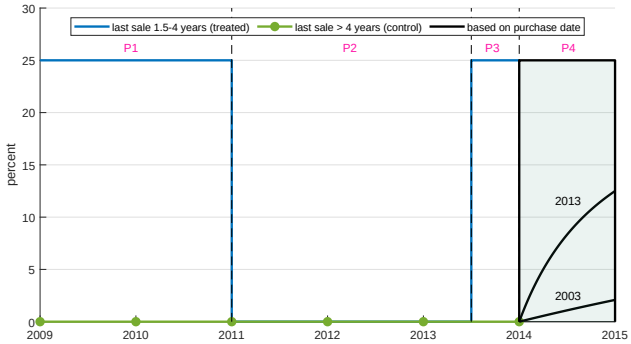

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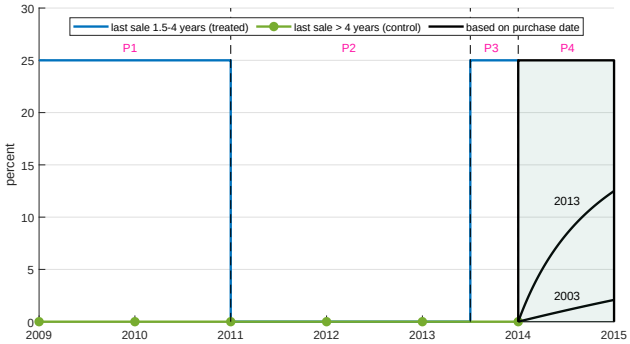
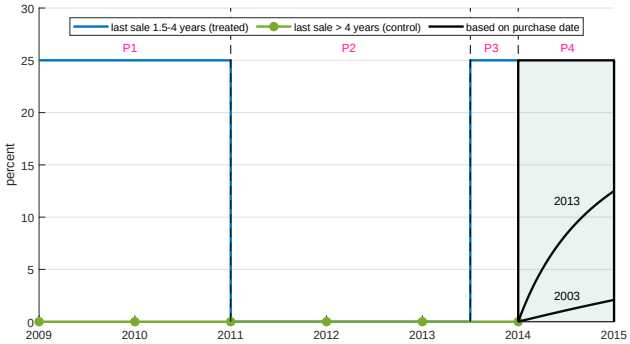
3. Tax changed several times, difficult to anticipate



4 features of tax changes help identification

1. Tax cut applies only to subset of investors
2. Assignment based on sale of other housing units
3. Tax changed several times, difficult to anticipate
4. Large impact on incentive to sell, small on incentive to buy



Data

- Housing stock from property tax, 76 cities (89% of Israel's housing stock)
  - identity of owner & tenant, investor composition
- Housing transactions from Israel Tax Authority (all eligible transactions)
  - transaction prices & unit char., identity of seller & buyer, sales history
- Additional sources:
  - population registry: construct households, identify primary unit of residence
  - rent survey (used for constructing CPI)

Descriptive stats of units sold

	seller type		investor's sale history	
	investor (1)	non-investor (2)	treatment (3)	other (4)
mean char.				
rooms	3.50	3.61	3.43	3.51
area (m^2)	78.2	80.9	77.1	78.3
building age	33.7	30.2	35.6	33.6
price (mil. ILS)	1.03	1.00	1.03	1.04
N	130,910	170,353	8,181	122,729

Notes. Treated: investors who sold in last 1.5-4 years. 1 ILS $\approx$ 0.28 USD

- Investors: 43% of secondary market sales (own 34% of stock)

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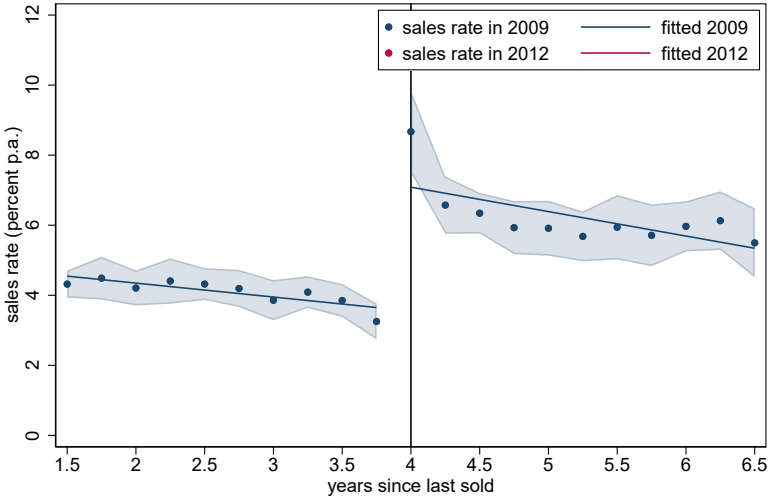
- Investors: 43% of secondary market sales (own 34% of stock)
- Treated & control: similar unit size and quality

Tax changes & investors' sales

- Sort investors by time since last sold: discontinuity in sales rates
- Estimate diff-in-discontinuity: month-by-month estimate of jump in sales

Discontinuity of investors' sales rates: before & after



- Pre-exemption discontinuity, eliminated by temp. exemption

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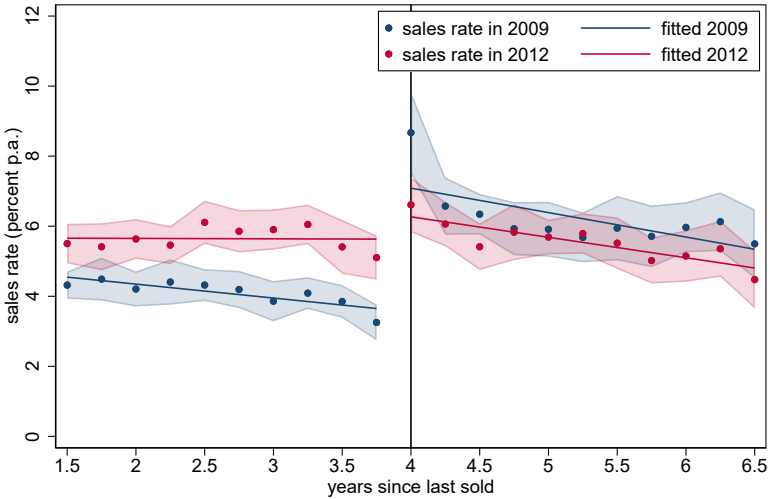

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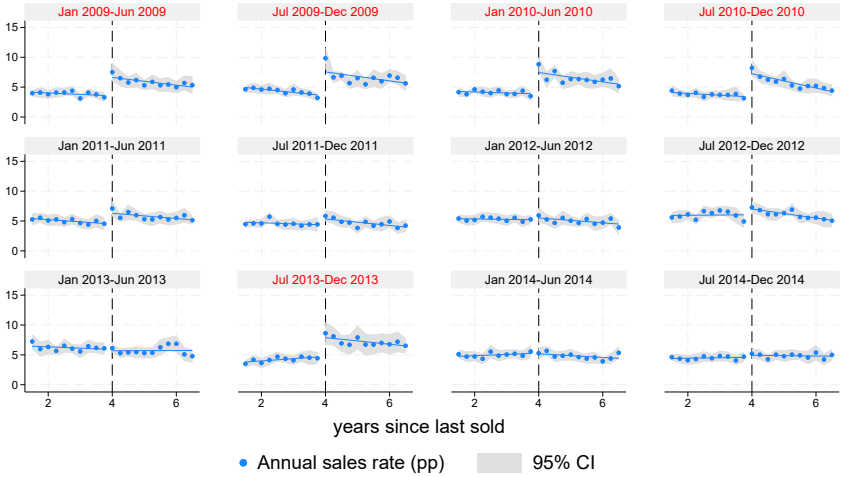
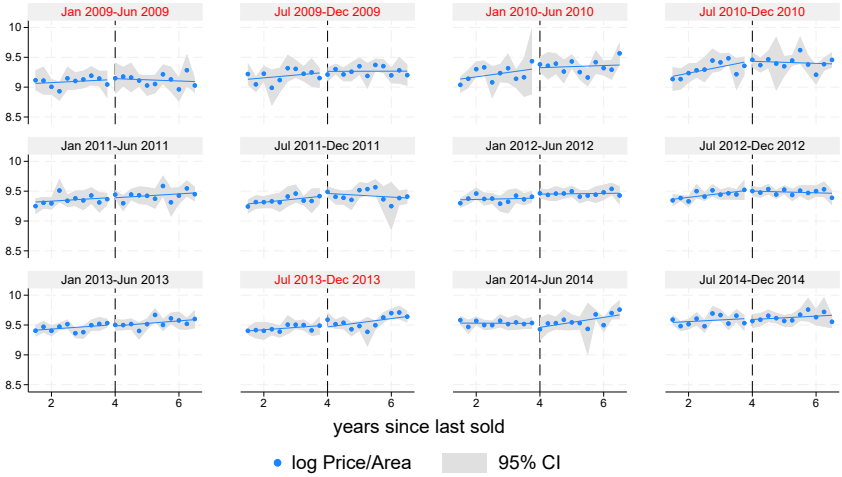
Discontinuity every half-year period

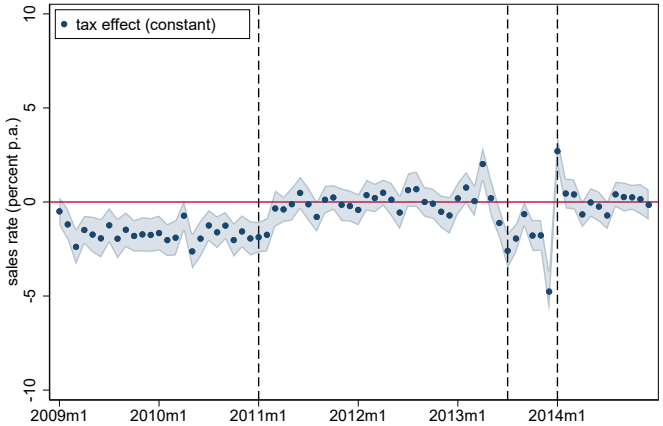


No discontinuity in price/m^2



Difference-in-discontinuity estimate

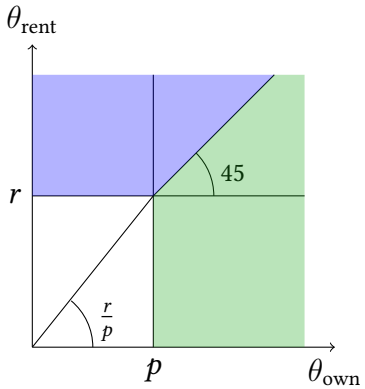
- Estimate tax effect at *household-month* level: control for age, marriage, num units
- Annual sales rate of treated increased, 4pp to 6pp



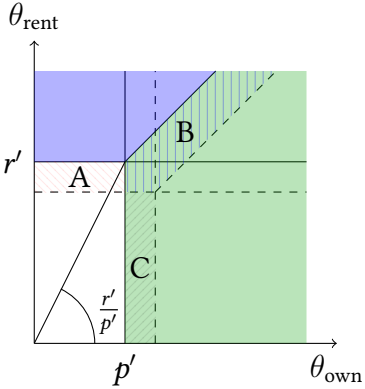
Theoretical framework

- Residents choose rent, own, or none; heterogeneous "willingness to pay" θ
- Investor exit: share renters ↓, share owners ↑; rent ↑, hp ↓

(a) Before investor exit



(b) After investor exit



Estimate effect on house prices & rents?

- Generally, difficult to estimate effect of quantities on prices
  - sales volume, prices, rents are jointly determined by local demand & supply factors
- Here: construct supply shifters using local investor ownership composition
- Identification conditions (Borusyak, Hull, & Jaravel, 2022):
  - capital-gains tax changes are independent of local demand shocks, or
  - composition of investors in local markets is uncorrelated with pre-trends

Test of pre-trend

Estimation with ownership shares

1. Mean $\widehat{\text{sales rate}}_{st}$ at aggregate level
   (owner type $s \in \{\text{noninvestor,treated,control}\}$, month t)

2. Predict sales rate with local ownership shares, $\text{share of units}_{sjt}$, as weights

$$\widehat{\text{local sales rate}}_{jt} = \sum_s \widehat{\text{sales rate}}_{sjt} \times \text{share of units}_{sjt}$$

3. Average of 6 previous months (including t, robustness 1 & 3 months)
4. Regress transaction prices or survey rents of unit i on predicted investors' sales

$$y_{ijt} = \beta \widehat{\text{local sales rate}}_{jt} + \gamma \mathbf{X}_{ijt} + \delta_j + \theta_t + \varepsilon_{ijt}$$

   - X_i:= housing unit char., share investors, seller/buyer type,
     δ_j:= local market FEs, θ_t:= monthly FEs

Effect of additional sales on house prices

Dependent variable:	log transaction price			
	(1)	(2)	(3)	(4)
Local sales rate	-0.110***	-0.110***	-0.102***	-0.172***
	(0.029)	(0.029)	(0.031)	(0.028)
New unit × sales rate		-0.002		
		(0.003)		
Small unit × sales rate			-0.009	
			(0.006)	
Tel-Aviv × sales rate				0.074***
				(0.022)
Jerusalem × sales rate				0.037***
				(0.008)
R^2	0.81	0.81	0.81	0.81
N	367,958	367,958	367,958	367,958

Effect of additional sales on rents

Dependent variable:	log rent			
	(1)	(2)	(3)	(4)
Local sales rate	0.054**	0.052**	0.068***	-0.008
	(0.025)	(0.025)	(0.025)	(0.030)
New leases × local sales rate		0.004		
		(0.004)		
Small unit × local sales rate			-0.015***	
			(0.005)	
Tel Aviv × local sales rate				0.037***
				(0.012)
Jerusalem ×local sales rate				0.041***
				(0.011)
R^2	0.79	0.79	0.79	0.79
N	59,764	59,764	59.764	59,764

Welfare implications

- Static interpretation highlights policy tradoff:
  - investor exit: 1% ↑ cost to renters for every 2% ↓ cost to owners
  - renters typically lower-income, younger
  - most of the impact on renters – in big cities

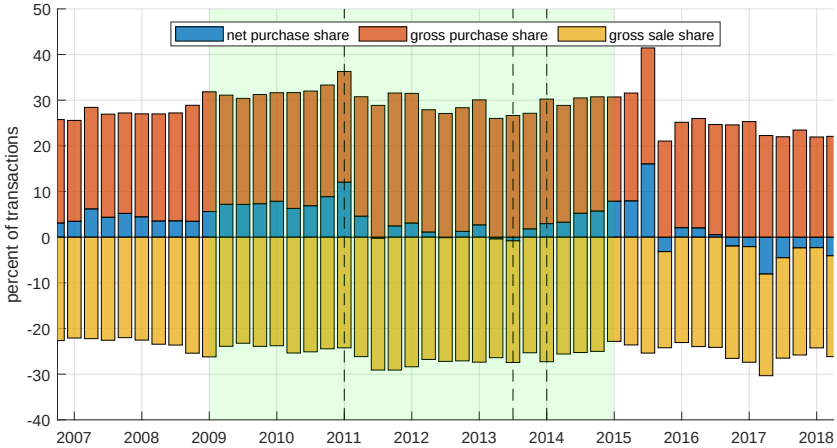
- Dynamic considerations more nuanced:
  - gains & losses concentrated on movers
  - existing owners insulated, reduced house prices offset by capital losses
  - existing renters partially insulated by contract duration & price stickiness
  - tax break: big gains to investors who cash out

Conclusion

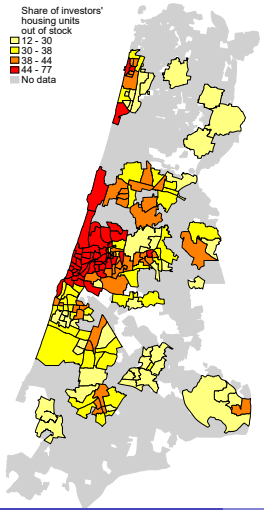
1. How do tax changes impact investors' sales?
   - sizable lock-in effect: tax reduction increased investor sales rate by 50%
2. How do additional investors' sales impact local house prices & rents?
   - 1pp increase in sales rate $\Rightarrow$ house prices 10% $\downarrow$, rents 5% $\uparrow$
3. Policy: pushing investors out reduces house prices, increase homeownership
   - ... but at the expense of renters, existing homeowners
   - welfare transfer to different new homeowners
   - long-run reduction in supply of housing makes housing less affordable

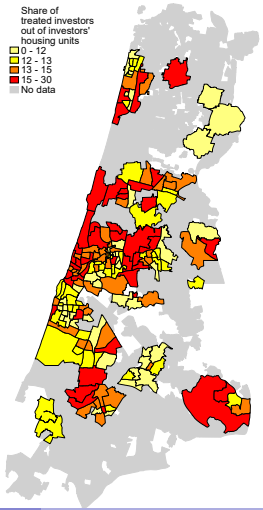
Appendix figures and tables

Net purchase share by investors



Investor ownership composition by local market (Central Dist., 2010)





Capital-gains tax in Israel

- 25% on *real* gains, introduced in 2000 and updated frequently.
- "qualified unit" := holding period>18m, last sale>18m, residential use
- Exemption if qualified unit and
  1. single-home owners: allowed to own up to 1/3 of another unit, capped 4.5M NIS (2013, infl. adjusted)
  2. upgraders: (1) bought *second* unit in the last 18/24 months; (2) sold 2 units < 2M NIS, bought 1 at up to 3/4 of value (once, regardless of other holdings)
  3. investors: did not sell another unit in the past 4 years
- 2011 reform ("emergency plan to reduce the cost of housing"): single-homeowner exemption extended to investors, capped at 2.2M
- 2014 reform: (1) eliminated exemption 3, but apply to gains post 2014, (2) capped
- Negligible tax revenue. Lock-in effect first order

Model overview

- Two types of agents ("residents", "investors") trade in continuous time t
  - residents: choose to own or rent, subject to preference shocks
  - investors: choose entry, when to buy/sell, subject to cost shocks
- Realistic treatment of tax system: dynamic tax basis and tax rates
- Naive beliefs about aggregates: rent & house price grow at a constant rate g
  - beliefs correct in stationary equilibrium!
  - related to the concept of "temporary equilibrium"
- Equilibrium market clearing condition:

  net flow of new homeowners + net flow of investor-owned units = 0

Model setup: residents

- Unit mass of hh's, consume $h \in \{\text{owned housing}, \text{rented housing}, \text{out}\}$, numeraire q
- Preference shocks with arrival rate μ, $\theta = (\theta_{\text{owned}}, \theta_{\text{rented}})$, positive, $\theta_{\text{none}} = 1$

$$u(h, q; \theta, t) = e^{gt}\theta_h + q$$

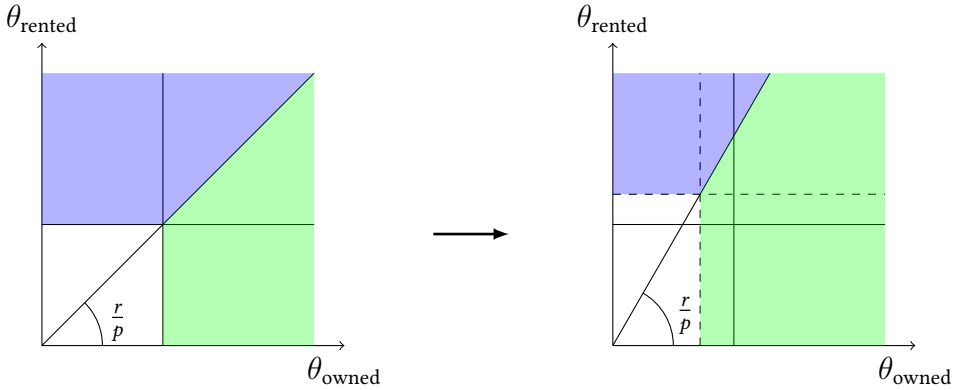
- Prices: r rent, p house price, ρ discount rate; $c := \rho p - \dot{p}$ user cost of owned housing
  - constant growth belief $\dot{p}/p = g \Rightarrow c = (\rho - g)p$
- Budget constraint:

$$c \times I(h = \text{owned}) + r \times I(h = \text{rented}) + q = \text{income}$$

- Bounded distribution $F(\theta)$, inelastic supply H, market clearing:

$$\mu \int_{\theta} I(h(\theta) = \text{owned}) dF(\theta) + \mu \int_{\theta} I(h(\theta) = \text{rented}) dF(\theta) = \mu H$$

Residents' choices given rent-to-price ratio

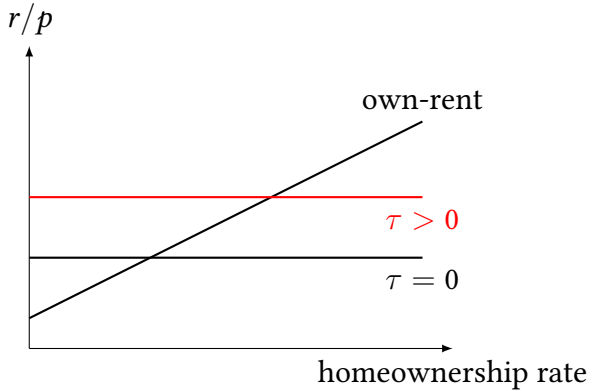


(a) low r/p (b) high r/p

- When $r/p \uparrow$: rent $\uparrow$, house price $\downarrow$, homeownership $\uparrow$

Static benchmark: capitalization effect

- After-tax rate of return $\frac{r}{p} + (1 - \tau)\frac{\dot{p}}{p}$ equals discount rate ρ (e.g., Weiss, 1978)



- Limitations: cg taxed upon *realization*, hetero. τ, lock-in effect, temporary/permanent?

Model setup: investors

- Risk neutral, discount time at rate ρ
- Own $n = 1$ or 2 identical housing units
- Differ in stochastic "management costs" m, net income flow

$$n \times r - \phi(n) \times m \times p, \quad \phi(1) = 1, \quad \phi(2) > 2$$

- Tax/transaction wedge:
  - when buying, pay purchasing tax (Israel: 4% to 8%);
  - when selling pay transaction cost + capital gains tax
  - tax rate & tax basis depend on transaction history
- Search friction: meet buyer at rate λ_B, meet seller at rate λ_S
- Exit: when selling at $n = 1$, Entry: flow increasing in expected value, draw $m \sim G(\cdot)$

The investor problem

- Solve for the optimal trades, given r_t, p_t (growth belief g)
- Normalized value function $V(n, m, T^s, T^h_1, T^h_2)$
  - n_t number of units,
  - m_t "management cost" ($\log m$ follows an Ornstein-Uhlenbeck process plus drift g),
  - $T^h_{j,t}$:= holding time for unit $j \in 1, 2 \Rightarrow$ capital gains tax basis

$$x(T^h) := (p_t - p_{t-T_h})/p_t = 1 - exp(-g \times T^h),$$

  - T^s_t := time since last sold $\Rightarrow$ tax rate $\tau(T^s)$
- Trade if after-tax payment + new value $>$ current value
- Satisfies the Hamilton-Jacobi-Bellman equation; solved on a grid

Quantitative implementation

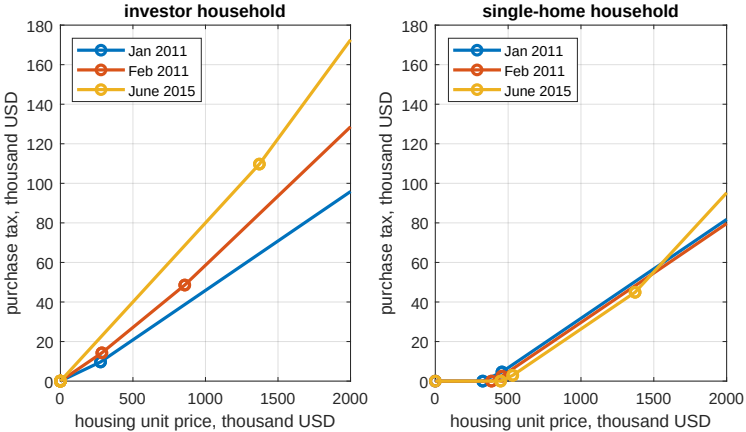
- Equilibrium condition: $i_t :=$ net investor outflow = net homeowner inflow
  - two demand functions, $p(i_t, t)$, $r(i_t, t)$

$$p(i,t) = e^{gt+\eta_p i}, \qquad r(i,t) = r(0,0)e^{gt+\eta_r i}$$

  - semi-elasticities η_p, η_r identified in the data (-0.1, +0.05)
- Set $g = 0.02$, $\rho = 0.03$, $r = 0.032$, and taxes according to code

- Process for m_t, λ_B, λ_S, $\phi(2)$, entry incomplete
  - goal: match moments on the distribution of observed types (num of units, holding periods)
  - here: pick parameters to replicate sales rate by time since last sold
  - hold flow of entrants fixed (may decide not to enter)

RE tax reforms in Israel: Purchase tax



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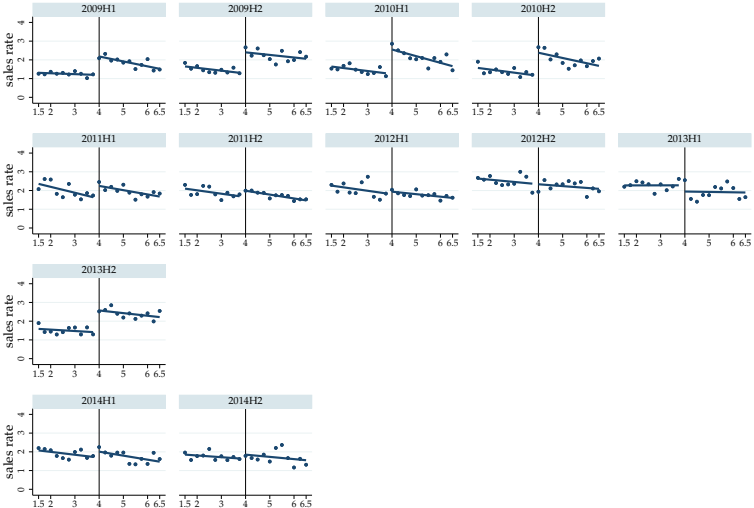
Discontinuity each half-year period



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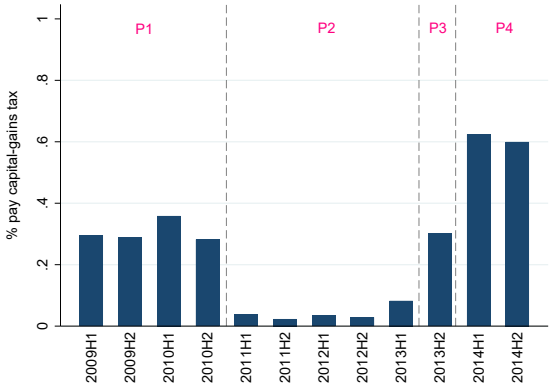
Direct evidence on tax payment

- Investors could avoid taxes by waiting, use other exemptions
- Some investments yield negative cap-gains, no tax liability
- Do treated investors pay capital-gains taxes?
- Capital-gains tax records indicate whether taxes are paid on each transaction

No taxes on treated investors during exemption period



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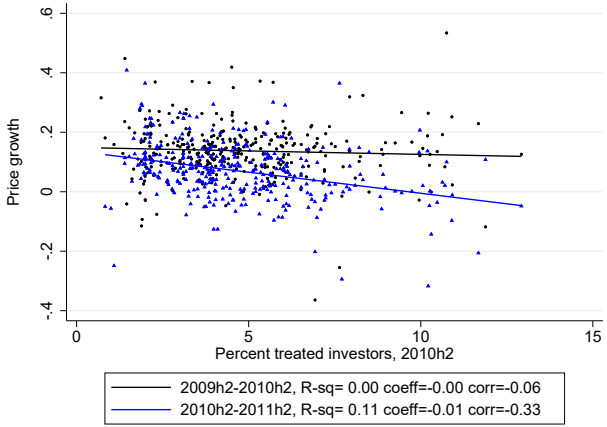
Where do non-investor buyers come from?

- Official residence of non-investor buyers in 1 year pre & 3 years post trade
- 13% already rented in the same location
- 60% moved in from another location
- 27% don't move in (noisy measurement)

$\Rightarrow$ Investors' sales change the allocation of rental housing

Identification concern: pre-treatment trends

- Policy may be designed in response to price appreciation in treated areas
- We find no pre-trend correlation between price appreciation, share of treated investors



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Distribution of local sales rate