Mortgate Interest Deductions: Not a Bad Idea After All?

Shahar Rotberg (CMHC)* and Joseph Steinberg (UofT)

September 10, 2023

* Shahar Rotberg co-authored this paper in his own personal capacity and time. The opinions expressed herein do not reflect the views of the CMHC.

Introduction

Motivation

Mortgage interest deduction (MID) and other homeowner subsidies are cornerstone of economic policy in US and many other countries

Previous studies all agree that repealing MID would increase welfare, but they fail to properly account for response of rental market in equilibrium

Two key factors determine this response

- Rental supply elasticity: determines how much rents respond to changes in demand
- Rent-to-income distribution: determines welfare impact of changes in rent, especially for low-income households

Once both factors are correctly accounted for, MID repeal would actually reduce welfare

Introduction

Methodology and findings

Simulate effects of MID repeal in GE using quantitative model

- Rental supply elasticity identified by renters' property tax incidence
- Rent-to-income distribution identifies minimum rental unit size

Highlight role of key factors using two alternative calibrations

- Infinite rental supply elasticity, but still matches rent-to-income distribution
- No minimum rental size, but still has realistic rental supply elasticity

Calibration	Chg. in rent (%)	Welfare impact (%)
Benchmark	2.35	-0.41
Infinite rental supply elast.	-0.92	0.93
No min. rental	0.80	0.14

Key factors

Key factors

Rental supply elasticity: economic intuition

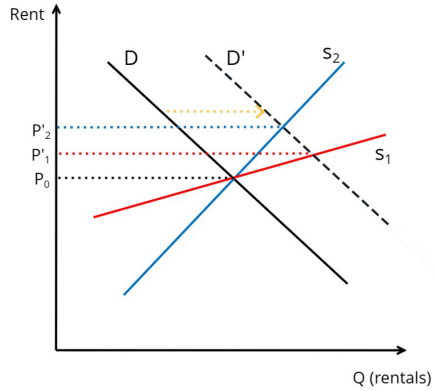
Rental supply elasticity governs how much rents change when demand for rental housing shifts

- High elasticity: small changes in rents
- Low elasticity: large change in rents

MID repeal has two offsetting effects on rents:

- Increases rental demand ⇒ slide along supply curve
- Reduces house prices ⇒ rental supply shifts down

Rents could go up or down in equilibrium depending on which effect dominates



Key factors

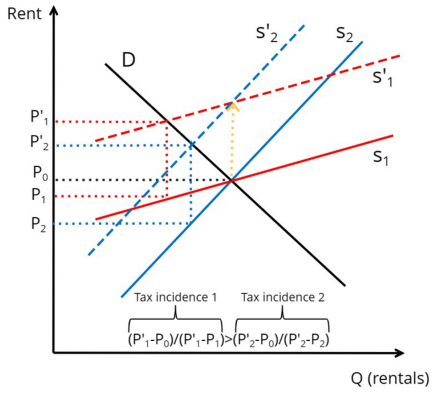
Rental supply elasticity: identification

New identification strategy using property tax incidence

- High elasticity: rents rise a lot; tax falls mostly on renters
- Low elasticity: rents rise less; tax falls more on landlords

Empirical estimates imply low rental supply elasticity

Study	Renters' share of prop. taxes
Carroll and Yinger (1994)	11%
Schwegman and Yinger (2020)	14%
Orr (1968)	30%
Orr (1970)	46%
Wiehe et al. (2018)	50%



Key factors

Rent-to-income distribution

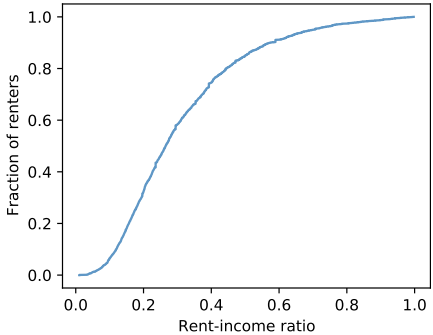
Lots of heterogeneity in renters' spending on housing

15% of renters spend 50+% of their income on housing

- "Severely cost-burdened" according to HUD
- Changes in rent have large welfare consequences

Generate realistic rent-to-income distribution in our model by imposing minimum rental size constraint

- Constrained renters unable to downsize when rents rise



Key factors

Previous studies

Previous quantitative studies of MID fail to account for at least one key factor

- Some have perfectly elastic rental supply, others have no min. rental size
- Appendix: endogenous-landlord models have approximately-infinite supply elasticities

Study	Rental supply elast.	Min. rental target
Gervais (2002)	Infinite	$\frac{\text{rent}}{\text{spending}}$ of bottom 20%
Chambers et al. (2009)	Endog. landlords	No min. size
Floettoto et al. (2016)	Endog. landlords	No min. size
Sommer and Sullivan (2017)	Endog. landlords	Not reported
Nakajima (2020)	Infinite	No min. size
Karlman et al. (2021)	Infinite	Not reported

Model

Model

Overview

Standard quantitative housing model

- OLG households heterogeneous in income, housing tenure, house value, net worth
- Long-term mortgages with borrowing constraints that apply at origination
- Representative construction company produces housing units
- Representative rental company supplies units to renters
- Government finances spending using progressive labor income taxes with deductions

Key factors captured by

- Rental supply elasticity: convexity of rental company's management cost
- Rent-to-income distribution: minimum rental unit size

Model

Demographics + preferences

Overlapping generations of finitely-lived households

- Maximum lifespan of J years, survival probability ϕ_j decreasing with age
- Mandatory retirement from labor market at age J_R
- Equivalence scale ξ_j captures changes in household size over life cycle

Flow utility from consumption and housing:

$$u_j(c,h) = \xi_j \frac{\left[c_j^{\gamma} h_j^{1-\gamma}\right]^{1-\sigma}}{1-\sigma}$$

Warm-glow preferences over end-of-life bequests:

$$w(b) = \mu \frac{b^{1-\sigma}}{1-\sigma}$$

Model

Endowments

Working-age ($j < J_R$) households' income given by $y_j(x, z) = \zeta_j x z$

- ζ_j: common life-cycle component
- x: idiosyncratic fixed effect constant over life cycle
- z: idiosyncratic AR(1) shock

Retired households ($j \geq J_R$) receive SS benefit $y_R(x, z)$

- Depends on fixed effect and value of shock at retirement

Newborn households receive financial wealth $a_1(x)$ with probability $\theta(x)$

- $\theta'(x) > 0$: higher-income newborns more likely to have positive net worth
- $a_1(x) > 0$: higher-income newborns richer conditional on having positive net worth

Model

Housing

Renters ($o = 0$)

- Choose unit size $h \in \mathcal{H}_r = \{\underline{h}_r, \ldots, \bar{h}_r\}$
- Pay $p_r h$ each period

Owners ($o = 1$)

- Choose house size $h \in \mathcal{H}_o = \{\underline{h}_o, \ldots, \bar{h}_o\}$
- Buy (sell) at price ph, pay proportional transaction cost τ_b (τ_s)
- Pay property taxes τ_p and depreciation δ on house value ph each period

Model

Mortgages

Mortgages can be used to finance initial purchase or refinance

- Fixed origination cost ω_1
- Interest rate r_m on balance m
- Minimum principal payment: $\nu_1 m$
- Paying more than $\nu_2 m$ triggers prepayment penalty: $\tau_{pp}(m, m) = \omega_2 \max[(1 - \nu_2)m - m', 0]$

Borrowing constraints apply at origination:

- LTV: $m < \lambda_1 ph$
- GDS: $\tau_p ph + (r_m + \nu_1)m \leq \lambda_2[y_j(x, z) + ra]$

Model

Taxes

Progressive taxes as in Heathcote et al. (2014):

$$\tau_j(x, z, m) = \tilde{y}_j(x, z) - \tau_l \tilde{y}_j(x, z, m)^{\psi}$$

Choice of standard or itemized deduction:

$$\tilde{y}_j(x, z, m) = \max\{y_j(x, z) - \tau_e - \max[\tau_d, r_m m], 0\}$$

- τ_e: Personal exemption
- τ_d: Standard deduction
- $\tau_m r_m$: Mortgage interest

Model

Household problem

$$V_j(s) = \max_{c,a',o',h',n,m'} \left\{ u_j(c,h') + \beta\phi_j \int_{\mathcal{Z}} V_{j+1}(s')\, \mathrm{d}F(z,z') + (1-\phi_j) w_B(q') \right\}$$

subject to

$$\begin{aligned}
& c + a' + r_m m + (1-o')p^r h' + o\left[\delta + \tau_p + \mathbb{1}_{\{o'=0 \vee h' \neq h\}}\tau_s\right] ph + o'(1 + \mathbb{1}_{\{o=0 \vee h' \neq h\}}\tau_b) ph' \\
& \qquad = y_j(x,z) - \tau_j(x,z,m) + [1 + r(1-\tau_r)]a + oph + m' - m - n\omega_1 - (1-n)\tau_{pp}(m,m') \\
& a' \geq 0 \\
& h' \geq o'\underline{h_o} + (1-o')\underline{h_r} \\
& n \in \{0, o'\mathbb{1}_{\{j<j_R\}}\} \\
& nm' \leq \lambda_1 ph' \\
& n[\tau_p ph' + \nu_1 m'] \leq \lambda_2(y_j(x,z) + ra) \\
& (1-n)m' \leq (1-\nu_1)m \\
& q' = a' + o'\left[ph'(1-\delta-\tau_p) - m'\right]
\end{aligned}$$

Model

Housing construction

Construction company as in Sommer and Sullivan (2017) chooses how much new housing to build subject to convex cost:

$$\max_X \{pX - \epsilon_1 X^{\epsilon_2}\}$$

Price elasticity of housing supply governed by ϵ_2:

$$p = \epsilon_1 X^{\epsilon_2 - 1}$$

Steady-state relationship between stock and flow:

$$H' = H = X/\delta$$

Model

Rental supply

Rentals supplied by management company with convex cost as in Chambers et al. (2009). Given current rental stock S, chooses new stock S' to max PDV of profits:

$$W(S) = \max_{S'} \{p_r S' - \theta_1 S'^{\theta_2} - p(S' - S) - p(\delta + \tau_p)S + \frac{1}{1+r} W(S')\}$$

Rental supply curve:

$$p_r = \theta_1 (S')^{\theta_2 - 1} + \left[\frac{r + \delta + \tau_p}{1 + r}\right] p$$

- Elasticity governed by θ_2
- Shifted by changes in house price p

Model

Aggregation

Housing and rental markets clear:

$$H' = \sum_{j=1}^{J} \int h'_j(s) \, \mathrm{d}\Psi_j(s)$$

$$S' = \sum_{j=1}^{J} \int [1 - o'_j(s)] h'_j(s) \, \mathrm{d}\Psi_j(s)$$

Government budget balances:

$$G + \sum_{j=j_R}^{J} y_R(x,z) \, \mathrm{d}G(x) \mathrm{d}F(z) = \tau_p p H \sum_{j=1}^{J} \int [\tau_j(x,z,m) + \tau_r r a] \, \mathrm{d}\Psi_j(s)$$

Calibration

Calibration

Strategy

Calibrate model to match U.S. data from pre-TJCA period

- TJCA doubled standard deduction, leading to big drop in itemized tax filings. Previous studies predate TCJA, and goal is to show how our two factors overturn their findings
- First step: some parameters assigned or independently calibrated to one-for-one moments
- Second step: remaining parameters jointly calibrated

Key factors:

- Rental supply elasticity: target 50% property tax incidence for renters (Wiehe et al., 2018)
- Minimum rental unit size: target share of renters who spend 50+% of income on housing

Alternative calibrations: match one key factor target only (not both)

- Infinite rental supply elasticity
- No minimum rental size

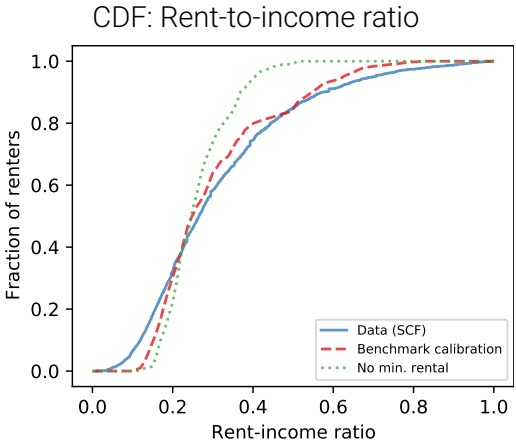
Calibration

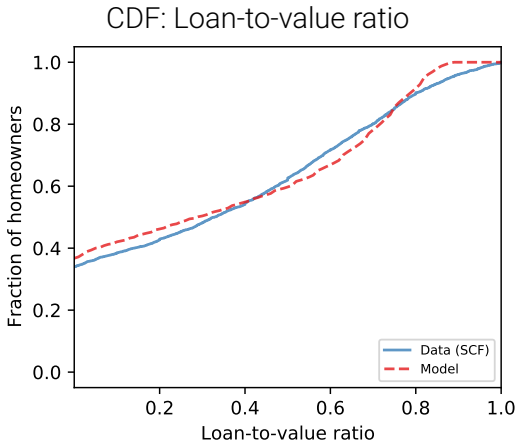
Validation – Cross section 1

Statistic	Model	Data	Source
Homeowners with a mortgage (%)	64.0	66.3	SCF (2019)
Homeowners with LTV≥80 (%)	13.3	10.7	SCF (2019)
Households who take the MID (%)	27.1	22	JTC (2010)
Share of rental vouchers captured by landlords (%)	55	25–100	Various studies
Renters by income quintile (%)			
First	66.0	60.9	SCF (2019)
Second	36.6	44.8	
Third	35.4	35.0	
Fourth	28.6	20.4	
Fifth	16.9	9.1	

Calibration

Validation – Cross section 2

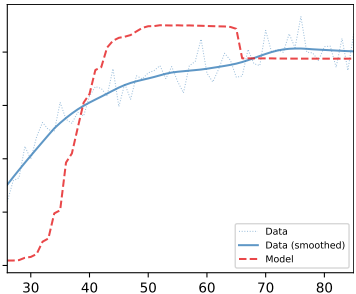




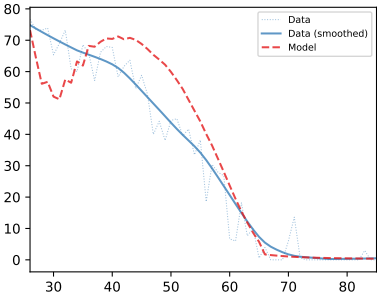
Calibration

Validation – Life cycle

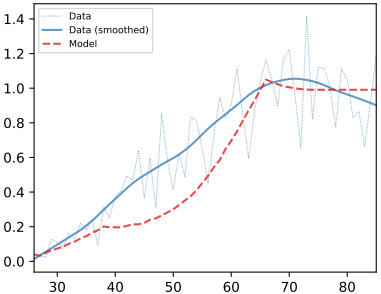
Homeownership rate



Loan-to-value ratio



Net worth



Results

Results

Experiment & results

Experiment: Repeal MID

- Restore fiscal balance by cutting income taxes
- Focus on long-run effects in benchmark calibration vs. alternatives

Calibration	House price (% chg.)	Rent (% chg.)	HO rate (p.p. chg.)	Welfare (% chg.)	Approval (%)
Baseline	-1.10	2.35	-1.46	-0.41	59.80
Infinite rental supply elast.	-1.70	-0.92	-2.50	0.93	100.00
No min. rental	-0.72	0.80	-1.62	0.14	85.39

Results

Sensitivity analysis

Results robust to…

- Key factor calibration: higher rental supply elasticity and smaller minimum rental size
- Additional ways renters can adjust to rent increases: endogenous labor supply
- Other parameters that determine price responses: aggregate housing supply elasticity

Alternative rental market structure where households can choose to become landlords

- Elasticity of aggregate rental supply curve approximately infinite
- Explains why studies that use this structure (e.g., Sommer and Sullivan, 2017) find welfare gains

Rent subsidies instead of tax cuts would make MID repeal beneficial

- But would actually worsen effects of bigger reforms like taxing imputed rents
- Rental demand—and thus rent prices—rise substantially more; subsidies too small to offset

Conclusion

Conclusion

We overturn widely-accepted result that repealing MID would increase welfare

Previous studies fail to properly account for two key factors that govern effects on rental market in equilibrium:

- Rental supply elasticity: governs how much rents respond to changes in demand
- Rent-to-income distribution: governs how many renters are severely affected by changes in rent

Key factors have implications for many other housing-related issues

- How much has recent immigration surge in Canada driven rents upward? How much has this hurt low-income renters?