Questions: What are the welfare impacts of home tax credits and removing the asymmetric tax treatment between owning and renting in general equilibrium? Who wins, who loses?

1 Introduction

• Many government interventions because there is this wide-spread belief that homeownership has important personal and societal benefits:
  – Mortgage interest rates are subsidized (Fannie Mae, Freddie Mac)
  – Favors owner-occupied housing:
    * exempting imputed rents on owner occupied housing from income taxation
    * BUT landlord pays taxes on the income received from rental units (but landlords deduct depreciation of rental property from rental income)
  – Deduct mortgage interest payments if itemize: $773 billion deductions by 40 million homeowners
  – Short-term incentives: First Time Home Buyer Tax Credit (“FTHBTC”) of up to $8,000 in 2008-2009

• Model simulates temporary and permanent changes and their impact on housing and rental prices, quantities and welfare of agents of different incomes and ages.
  – introduce taxes on imputed rents (9 of 24 OECD countries: e.g. Netherlands)
  – remove taxes on rental income AND deductions on interest (no deductibility of mortgages in Germany, France, UK, Sweden) and depreciations

• Sections 4.3 (which explains current tax subsidies) and 7 (which discusses the policy simulation for homebuyer credits) are most PF oriented

2 Model

Notes:
• Equation numbers refer to the equation numbers in the paper version (from Booth website)
• key equations are in bold
• this note summarizes main idea’s while exact equations are in paper
2.1 Household

- (1): Household receives utility from consuming housing services $\tilde{h}$ and nondurable consumption numeraire good $c$. Preference for owning over renting.
- (2): Housing services from renting (renters) or non-rented owned house (owner).
- (4) and (5): Labor is supplied inelastically between 20 and 65 (9 cohorts) and labor income $y_{i,t}$ is product of agent-specific productivity and individual productivity (which faces persistent idiosyncratic shocks).
- (6): Retirees receive SS benefits as a given fraction $g$ of the working population’s average income (financed with a labor income tax $\tau^{ss}$).
- (7): Exogenous moving shocks.
  - If moving:
    * Deadweight transaction costs related to buying and selling a house
    * Transaction costs for moving renters normalized to zero
  - If not moving:
    * maintain housing stock: maintenance expense (no transaction cost)
    * let house depreciate (no transaction cost)
    * different level -> positive transaction costs
  - If landlord: fixed per period participation costs
- (8): Invest in risk free bond $s'$ that pays $r$.
  - Positive: savings
  - Negative holdings: borrowing
    * Maximum debt capacity: assume $s' < 0$, then we get a constraint on indebtedness $-s' = debt < (1 - d)hp = debt_{max}$
- (9): Budget constraint for working agent
  - Expenditures: consumption, purchasing next period bonds, purchasing new house stock, transaction costs, positive taxes net of deduction
  - Incomes: rental income, income from bonds/payment mortgage interest, labor income net of taxes, selling old house stock and lump-sum transfer payments
  - Government intervenes by fixing $T$ and $D$
- (10): The retiree chooses his savings, housing stock and housing consumption services to maximize flow utility and continuation utility s.t.
  - Budget Constraint
  - Additionally consumed resources before death=savings+ proceeds from selling house
  - Laws of motions for the key aggregate state variables: transfers, house prices and rental prices:
    * Constant in a stationary equilibrium
    * If unexpected policy change, then rational expectations imply that HH’s have perfect foresight about time path of prices and transfers on the transition to the eventual steady state
- (11): Similar for worker but no death probability
2.2 Housing Supply

- Since developing additional units becomes more expensive (decreasing quality of land), the maximization problem of the construction firm results into:
  - an upward sloping supply curve for new houses
  - a law of motion for the aggregate housing stock increasing in the house prices (14)

2.3 Government intervention

- Government can tax labor income, capital income and rental income
- Taxes levied on actual and imputed rental income
- Policy is a tax bill, $\max(0, T-D)$
  - Total taxes owed:
    * labor income taxes
    * capital income taxes
    * tax on rental income (real and imputed) less depreciation
- (15):
  - Potential deductions:
    * no tax on owner consumed housing
      - intuition $h - \tilde{h} = \text{rentalunits}$ is the tax base
    * Deductibility of all mortgage interest
    * FTHBTC
    * General Home Buyer Tax Credit (“GHBTC”)
- In baseline US policy regime, $\psi_1 = \psi_2 = 1$ and $\psi_3 = \psi_4 = 0$
- (16): Balanced budget: lump sum transfers equal total taxes (summed over all agents, cohorts, houses and savings)

2.4 Market clearing and equilibrium definition

- Purchase and rent prices for housing are set by market clearing conditions
  - (17): demand of houses=supply of houses
  - (18): Rental units supplied= rental units demanded
- Given $T, D$ and $r$, a stationary recursive CE is defined by:
  - rental and home prices
  - value and policy functions for households
  - a policy function for construction sector
  - lump sum transfers
– invariable distribution of households over families, houses, cohorts and bond holdings s.t.:

1. Given prices and transfers, households optimize;
2. Given prices, the construction sector optimizes;
3. Housing and rental markets clear;
4. Distribution is invariant w.r.t. exogenous Markov process for labor productivity and policy functions $h$ and $s'$

3 Welfare criterion for policy analysis

• Instantaneous welfare effects: (19):
  – Immediate change in expected discounted life time utility after a reform?
  – 1st economy reforms unexpectedly while 2nd does not
  – $\Delta c$ is the one-time change to period $t$ consumption of agents in economy 2 s.t. they are as well off as agents of the same type in the first economy (if the number is positive, then the reform increases welfare)

• Steady state comparisons

4 Calibration

• Calibration is done in 2 ways:
  – Pre-defined parameter values for “relatively well identified/observable parameters” (e.g. Price elasticity of housing construction $\epsilon = 2.5$)
  – Methods of moments in Table 2 for “relatively less well identified/observable parameters”
    * E.g. Match data average homeownership rate of 67.4% by fixing utility discount for rentals $\lambda$ at 0.887 while the model gets 68%

5 Tax credits

5.1 FTHBTC

• Figure 2 shows the Aggregate effects
  – “HH’s shift forward purchases of housing”
    * Thus prices rise/transaction volumes spike BUT since there is no new demand, we then get a drop of prices and volumes below the initial steady state
    * Thus rental prices drop
  – “Construction sector reacts to higher prices”
    * Housing quantity jumps before depreciation pushes stocks gradually back to the steady state
  – “Transfers fall since government has to finance tax credit”

• The price increase is the smallest for the high-elasticity economy

• Overwhelmingly negative welfare effects since about 90% of HH’s in medium elasticity economy is worse off. All non-purchasers lose because transfers drop:
- Initial owners:
  * Most of them lose (lower transfers) but some gain if temporary price increase allows to adjust housing stock downward (closer to optimum which was previously prevented by adjustment costs)
- Initial renters:
  * Some first-time homebuyers lose because of higher prices (so not much more housing purchased....)
  * Non-purchasing renters lose on net (lower transfers vs. lower rental prices)

- Non-monotone effects of increase in elasticity
  - More initial owners and landlords suffer because:
    * Bigger drop in transfer payments (more tax credits because more purchases because slower price increase because more new houses)
    * Bigger drop in rental prices hurts landlords
  - Fewer renters lose because bigger drop in rental prices

- Winners and losers?
  - Winners: Young and rich households who can purchase a house
  - Losers: others (lower transfers, house price spike may delay buying/trigger suboptimal housing consumption)

5.2 Repeat Home Buyer Tax Credit (RHBTC)

- Qualitatively similar but response of trading volume is larger given expanded eligibility
- RHBTC is preferred because with FTHBTC a higher share of losers are initial owners who are richer and require a bigger absolute change in consumption to compensate them for a given fall in utility

5.3 Tax credit discussion

- Disadvantages of policy:
  - Higher trading volumes lead to higher DWL transaction costs
  - Lower transfers
- GE price effect limits advantage, namely the extra housing consumption
- Limitation of model without uncertainty:
  - Tax credit could resolve uncertainty and correct suboptimal postponing of purchases
  - No countercyclical policy considerations here

6 Permanent changes

6.1 Taxes on imputed rents

- Prices and quantities
  - Lower incentives to own
  - Homeownership rate drops from 68 to 39.9%! 
House prices drop by 5.3% despite decline in housing stock by 12.5%

* Note: the more elastic, the smaller the price drop, the bigger the impact on homeownership

Homeowners more willing to lease out some of their housing stock (“more than half of the homeowners are also landlords now”)

* Baseline tax wedge induces homeowners to over-consume housing services out of their own housing stock -> housing share in consumption falls

Average Loan-To-Values (“LTV’s”) drop because credit-constrained poor buy less -> lower mortgage interest payment deductions -> higher tax revenues

**Welfare:**

- 66.6% is better off
- Lump sum taxing winners and compensating losers would raise government revenues for one period by 1.39% of income
- The higher the elasticity, the higher rents, the higher taxation of rents, the more % of HH’s lose

**Winners:**

* All renters: Positive impact of higher transfers exceeds negative effect of higher rents

**Losers:**

* Rich and old lose because lump-sum transfers are relatively small for them and because imputed rents are large

**Transition:**

- House prices plummet and recover but reach lower level (lower aggregate demand for houses)
- Depreciation leads to lower stock
- Rental prices initially drop because owners dump rental units (housing stock does not immediately adjust downward): “supply overhang in the rental market”
  * Rich initially reduce both housing and non-housing consumption
- Lower prices forces HH’s with high LTV mortgages to inject equity (cannot go underwater/walk away)

6.2 No taxes, no deductions

**Prices and quantities:**

- House prices fall but by less than in 1st experiment (removal mortgage deductibility reduces demand but removal of taxes on rental income increases demand real estate)
- Rental prices drop because no taxes on rentals
- Rich less dependent on mortgage financing who own larger housing stock
- Rental market increases and homeownership drops
- Total transfers increase (gain from mortgage deduction elimination dominates loose from end of taxation of rental income)

**Welfare:**

- 82.2% is better off
- Losers:
  * Medium income HH’s who recently bought mortgage and are not landlords
Winners:
* Older and richer because less mortgage financing and more non-taxed rental incomes

7 Conclusion

- Tax credits do temporarily raise prices and volumes but then drop below initial level to recover steadily but welfare effect are negative for most HH’s
- Comparing the 2 options to end asymmetry: (i) Taxing imputed rents and (ii) no taxation rents and no deductions
  - both lead to higher welfare when comparing s.s and transitions
  - in aggregate welfare terms removal of taxes and deductions appears superior but harms middle income agents (vs. taxing imputed rents harms the rich agents)
- Hence preferred tool for removing asymmetry in tax treatment depends on a trade-off between aggregate and distributional objectives and the feasibility of lump-sum compensation schemes.