14.471: Fall 2012: Recitation 4: Government intervention in the housing market: Who wins, who loses?

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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 $y_{i,j,t}$ 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 τ^{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 cots
    - 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 choses 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

- Competitive construction sector transforms land available into new housing stock. Buys land and sells at market price p.

- 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 $h - \tilde{h} = rentalunits$ 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
    - Δc 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 λ 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 tock -> 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.

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