

Discussion of “Tax, Credit Constraints, and the Big Costs of Small Inflation” by Andrew Coleman

RBNZ Housing Conference

Aaron Hedlund

December 11-12, 2017

University of Missouri

Agenda for today

1. Research Question and Findings
2. Brief Model Overview
3. Comments

Research Question and Findings

What Is This Paper About?

- **Motivation:** Concerns about homeownership falling in low-inflation New Zealand because of tax laws that favor investment in rental properties over interest-bearing assets.
- **Research Question:** How do inflation rates and tax laws interact to impact house prices, rental prices, and the homeownership rate?
- **Approach:** develop, calibrate, and analyze an open-economy macro model with housing and rental markets.

Main Findings

- **Inelastic supply, all interest earnings taxed:**
 - *Capital income not taxed:* inflation has no impact on prices or rents, but the homeownership rate falls with inflation.
 - *Capital income taxed:* house prices bid up by landlords and homeownership rapidly falls with inflation.
- **Elastic supply, all interest earnings taxed:**
 - *Capital income not taxed:* similar to inelastic supply case.
 - *Capital income taxed:* rents and homeownership fall with inflation.
- **Exempting the inflation component of interest from taxation:**
 - House prices (inelastic) and rents (elastic) are insensitive to inflation, though homeownership still falls slightly with inflation.

Brief Model Overview

Model Summary

- Preferences: $\ln(c_t^i) + \sum_{h \in \{R, F, H\}} \mathbf{1}_h v^h$, where $v^H > v^F > v^R$.
- Endowment: $Y_t^i = \omega g_i Y_{t-i}^0$, with ω idiosyncratic and permanent.
- Houses left as bequests after $i = 3$ but assets/debt are liquidated.
- Taxes: consumption τ_g (excludes housing), capital (τ_1, τ_2) applied to rent and interest (but not imputed rent), and no capital gains tax .
- Only $i = 0$ can live at home; only $i = 0$ and $i = 1$ may rent; housing choices cannot worsen; only $i = 2$ can be landlords.
- LTV and PTI constraints are only imposed at $i = 0$ and $i = 1$.

Model Summary: Constraints

- Budget constraints for $c_{t+i}^i, B_{t+i}^i, D_{t+i}^{i,-} \geq 0, h_{t+i}^i \in \{R, F, H\}$:

$$(1 + \tau_g)P_t c_t^0 + B_t^0 + P_t^h = P_t Y_t^0 + D_t^0$$

$$(1 + \tau^g)P_{t+i} c_{t+i}^i + D_{t+i-1}^i (1 + r_{t+i-1}) + B_{t+i}^i + P_{t+i}^{h_{t+i}^i} = P_{t+i} Y_{t+i}^i$$

$$+ B_{t+i-1}^i (1 + r_{t+i-1} (1 - \tau^i)) + D_{t+i}^i + \mathbf{1}_{[h_{t+i-1}^{i-1} \in \{F, H\}]} P_{t+i}^{h_{t+i-1}^{i-1}} + \mathbf{1}_{[i=2]} Inherit_{t+2}$$

$$+ \mathbf{1}_{[i=2, landlord_2=1]} P_{t+2}^R (1 - \tau^2) + \mathbf{1}_{[i=3, landlord_2=1]} \left[\underbrace{P_{t+3}^F - P_{t+2}^F (1 + r_{t+2} (1 - \tau^2))}_{\text{financed by 100\% loan}} \right]$$

- LTV constraint: $D_{t+i}^{i,-} \leq \theta P_{t+i}^{h_{t+i}^i}$

- PTI constraint: $\underbrace{D_{t+i}^{i,-} \frac{r_{t+i}}{1 + r_{t+i}} \left[\frac{(1 + r_{t+i})^{\tau/T}}{(1 + r_{t+i})^{\tau/T} - 1} \right]}_{D_{t+i}^i} \leq \delta Y_{t+i}^i$

Comments

Inelastic supply, all interest earnings taxed:

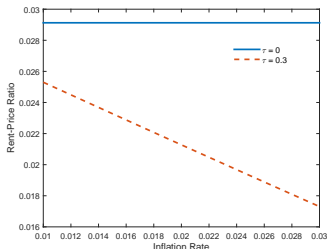
- *Capital income not taxed*: inflation has no impact on prices or rents, but the homeownership rate falls with inflation.
 - Higher inflation causes the nominal PTI constraint to bind.
 - Higher inflation increases payments at the beginning of the amortization schedule but gradually erodes the real value of debt.
- *Capital income taxed*: house prices bid up by landlords and homeownership rapidly falls with inflation.
 - Because *nominal* interest is taxed, higher inflation \Rightarrow real return on interest-bearing assets decreases \Rightarrow surge of investment-motivated purchases of tax-free housing.
 - Landlords replace low-income owner-occupiers.

Intuition for the Results: II

Elastic supply, all interest earnings taxed:

- *Capital income taxed*: rents and homeownership fall with inflation.

$$\frac{P^R}{P^F} = \frac{1 + R(1 - \tau) - (1 + \pi)}{(1 - \tau)(1 + R(1 - \tau))}$$



Exempting the inflation component of earnings from tax:

- Prices and rents unaffected by inflation but ownership still declines.
 - Inflation becomes *almost* neutral except for the presence of rigid mortgage contracts and the nominal PTI constraint.

Comments: Refinancing, HELOCs, and Mortgage Rigidities

- Without capital taxes, the rigidity of mortgage contracts and inability to refinance/access other mortgage instruments likely drives much of the impact of inflation on homeownership.
- With one-period contracts, borrow d' in real debt today and pay back $\frac{d'(1+R)}{1+\pi} = d'(1+r)$ next period \Rightarrow inflation irrelevant.
- With long-term self-amortizing mortgages ($\gamma < 1$), inflation front-loads payments. See Garriga, Kydland, and Sustek (2017):

$$\frac{m_1}{p_1} = \frac{i_1^M + \gamma_1}{1 + \pi_1} \tilde{l}_0, \quad \text{in } t=1,$$

$$\frac{m_2}{p_2} = \frac{i_2^M + \gamma_2}{(1 + \pi_1)(1 + \pi_2)} (1 - \gamma_1) \tilde{l}_0, \quad \text{in } t=2,$$

$$\frac{m_3}{p_3} = \frac{i_3^M + 1}{(1 + \pi_1)(1 + \pi_2)(1 + \pi_3)} (1 - \gamma_2)(1 - \gamma_1) \tilde{l}_0, \quad \text{in } t=3,$$

- One-period contracts can be replicated by cheap refinancing and/or easy availability of second mortgages/HELOCs.

Comments: Miscellaneous

- How to implement exempting inflation on long-term contracts?
- Disentangle impact of mortgage rigidities vs. PTI constraints.
- What if PTI constraints omitted the inflation component (i.e. used *average real payment* over the mortgage duration)?
- What explains the highly non-monotonic welfare results?
- Why restrict household choices? Is there any impact?

