Discussion of "Mortgage Prepayment and Path-Dependent Effects of Monetary Policy"
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Discussion

- refis are complicated
  - optimal exercise of American option, no closed form solutions except in stark cases, high transaction costs/behavioral problems, strong life cycle patterns, idiosyncratic shocks in income and house prices, various maturities, moving decisions and household formation, ....

- paper proposes a simple refi model

- paper documents empirical fact: prepayment rate is path-dependent
  - depends on gap between locked-in rate and current mortgage rate
  - well known in mortgage literature
    - for example, Table 2 in Schwartz and Torous 1989 based on prepayment rates in Ginnie Mae 30-year mortgage pool data 1978-1989

- model generates path-dependent refis
Model of refis

- no housing/mortgages, transaction costs

\[
\max_C \mathbb{E} \left[ \int_0^\infty e^{-\delta t} \frac{C_t^{1-\gamma}}{1-\gamma} \, dt \right]
\]

s.t. \( dW_t = [Y_t - C_t + r(a_t) W_t - m(a^*_t) F] \, dt \)

\( W_t \geq 0 \)

- fixed income \( Y \), receive only \( B \) with some constant probability
- Markov chain for finite aggregate state \( a \), save at rate \( r(a) \)
- infinite maturity "mortgage": fixed amount \( F \), locked-in state \( a^* \) determines \( m(a^*) \), payment \( m(a^*) F < B \)
- how does \( a^* \) change? attention and moving arrive with constant Poisson arrival rates
  - attention: if \( m(a) < m(a^*) \), lock in \( a^* = a \)
  - moving: same \( F \), only resets \( a^* \) in \( m(a^*) \)

\[
da^*_t = \left( a_t - a^*_t - \left[ 1[m(a_t) < m(a^*_t)] \, dN_t^{(\tau_a)} + dN_t^{(\tau_m)} \right] \right)
\]
Model of refis

- consumption smoothing is key motive

- refi model is isomorph to special income shocks:
  - recession:
    - if rate $m(a)$ drops below $m(a^*)$, get positive income shock $F(m(a^*) - m(a))$ partially hedges more adverse income shocks in recessions
  - if rate $m(a)$ increases, no shock unless move

- can this model capture refi behavior?
Move at constant rate

- Poisson process $N^{(\tau_m)}$ for moving with constant arrival rate
- American Housing Survey asks movers about their reasons for moving
- Many movers have reasons that are unrelated to economics (natural disaster, fire, death of a spouse, marriage, divorce, kids ...)
- Landvoigt, Piazzesi and Schneider 2015 AER
- Krivenko 2018 constant moving probability is important for bust move also when unemployed in recession, pushes down house prices
Attention arrives at constant rate

- Poisson process $N^{(\tau_a)}$ for attention with constant arrival rate
- low prepayment rates in the data, even with large gap between locked-in and current mortgage rate
- optimal American option exercise predicts frequent refis
- literature on mortgage-backed securities backs out high costs to refi e.g. Stanton 1995
- Schwartz & Torous 1989 find that prepayment rates increase in squared gap
  - refis more likely if rates fall drastically
  - maybe Poisson arrival probability should depend on $a$?
Overall impact of rate changes?

- model is about rate-refis

- are positive income shocks $F(m(a^*) - m(a))$ quantitatively important?
  - impact on average $m(a^*)$ equals probability to get a new mortgage (refi or move): small

- how much do cash-refis contribute to overall consumption effect? higher MPCs?

- does the paper provide a lower bound?

- life cycle effects: young have twice as large consumption response (Wong 2017)