Heterogeneous Agents, Housing Market Participation and Welfare Cost of Inflation

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Motivating Facts
Motivating Facts
Introduction

- Large, chronic inflation in Iran.

- Interested in welfare costs of inflation in Iran.

- Incorporating housing market and heterogeneity of agents seem to be important factors in calculating cost of inflation, because low-income agents do not usually have access to the housing market to hedge against inflation.

- Revisit welfare costs of inflation considering the heterogeneous effects of access to the housing market.
### Percentage of urban households in terms of how to occupy used housing in the desired income deciles

<table>
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<tr>
<th>Year</th>
<th>Private Housing</th>
<th></th>
<th></th>
<th></th>
<th>Rent</th>
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<td></td>
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Introduction

What We Do

1. propose a non-convex, heterogeneous-agent model that incorporates housing market to calculate welfare cost of inflation.
2. study transitional dynamics, to study the excessive rise of housing prices and its implications on inflation.
3. study heterogeneous effects of inflation on households.
4. compare results with the case in which inflation is lower.
Introduction

Outline

1. Literature Review
2. Sketch of the Model
3. Expected Results
4. Counterfactual
Related Literature

- Cost of Inflation
- Heterogeneous agent models
- Housing Market
Cost of Inflation

Money Demand Function
- Baily (1956), Baro (1972), Fischer (1981)
- Baily (1956): The welfare cost of 10 percent inflation is 0.3 percent of GNP.

Money in Utility Models
- Lucas (2000), Kurlat (2018), ...
- Lucas (2000): The welfare cost of 10 percent inflation is less than 1 percent of GNP.

Cash in Advanced Models
- Dotsey and Ireland (1996): The welfare cost of 10 percent inflation is 1.73 percent of output.
Literature Review

- Search and Match Models
  - Lagos and Wright (2005), Boel and Camera (2009), Eden and Eden (2016), Faig and Jerez (2007), Chiu and Molico (2011), ...

  **Lagos and Wright (2005):** The welfare cost of 10 percent inflation is 3-5 percent of consumption.

- Overlapping Generation Models

  **Shutao Cao et al (2018):** The welfare cost is 14 percent lower than Lucas estimation.
Literature Review

- financial market imperfection
  - mrohoroglu (1992), Chiu and Molico (2011), Aruoba et al (2007), Craig and Rocheteau (2008), ...

  The welfare effects in imperfect financial markets are greater than in complete financial markets

- Heterogeneous agent models

  Distribution effects vary depending on financial market access.

  Macroeconomic behavior in heterogeneous models is different from representative models.
The effects of rising housing prices on real variables are examined.

**Mitman et al (2013):**
- Subsidize the mortgage interest rate
- Increasing government support for homeownership leads to class divisions.
- Distribution of wealth from poor to rich.
- Elimination of subsidies increases welfare by a 0.5 percent of consumption.
Model

Environment

- Time is discrete and continues forever
- Two types of agents
  - High income
  - Low income
- Three types of assets market
  - Bond
  - House
  - Money
- Two types of goods
  - Final good
  - House
- Government
**Model**

**Environment**

- Agents can rent or purchase a house
- Consumption and rent are subject to CIA
  - Bonds are within period
- There is a constraint on house purchases
  - A minimum amount of investment required
Model

- Household Problem

\[
V^i(m^i_{-1}, g^i, \pi) = \text{Max}\{ U(c^i, h^i) + \beta EV^i(m^i, g'^i, \pi'|\pi) \}
\]

\[
i = H, L
\]

- Budget Constraint: \( Pc^i + P_h g'^i + B^i + M^i = PY^i + T + M^i_{-1} \)

\[
+ P_h g^i + (1 + i)B^i + P_l(g'^i - h^i)
\]

- CIA Constraint: \( Pc^i - P_l(g'^i - h^i) \leq M^i_{-1} + T - B^i \)

- Housing Constraint: \( g'^i \geq g_0 \quad \text{or} \quad g'^i = 0 \)
Model

- **Government**

\[ M = (1 + \theta)M_{-1} \]
\[ T = M - M_{-1} \]
Market clearing conditions

\[ \text{Housing MKT} : \sigma g'_H + (1 - \sigma) g'_L = \sigma h_H + (1 - \sigma) h_L = \bar{h} \]

\[ \text{Bond MKT} : \sigma b_H + (1 - \sigma) b_L = 0 \]

\[ \text{good MKT} : \sigma c_H + (1 - \sigma) c_L = \bar{y} \]

\[ \text{Money MKT} : \sigma m_H + (1 - \sigma) m_L = \bar{m} \]

\( \sigma \) and \((1 - \sigma)\) is share of high and low agent, respectively.
Expected Results

- Rising housing prices as a result of inflation shock.
- Increasing welfare cost of inflation for low type and decreasing for high type.
- Increasing the gap between high and low agents.
Counterfactual

- The effect of changing inflation
- Effect of changing $g_0$
- Tax on investment in housing
Thank You!
Appendix
Other Facts

Rental Index and CPI

Figure (3.1)
Other Facts

![Graph showing Rental Cost to Total cost](image)

**Rental Cost to Total cost**

*Figure (15.1)*

- **X-axis**: Year (1385 to 1400)
- **Y-axis**: Rental Cost to Total cost (0.29 to 0.34)

Key:
- recession38
- rent_cost

Legend:
- recession38
- rent_cost