Diverging Cost of Living
Causes and Consequences

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September 2023
Section 1

Introduction
Since 2008: very low interest rates in developed economies
Motivation

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- But this coincided with low inflation
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- However, some goods enjoyed high price growth: housing, health
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- Since 2008: very low interest rates in developed economies
- But this coincided with low inflation
- However, some goods enjoyed high price growth: housing, health
- Was inflation low for everyone? Or were some groups more exposed to high-growth items?
Construct group-specific CPIs for 2000-2019 in the US
This Paper

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- Propose alternative housing cost measure to conventional owners’ equivalent rent (OER)
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- Construct group-specific CPIs for 2000-2019 in the US
- Propose alternative housing cost measure to conventional owners’ equivalent rent (OER)
- Investigate the role monetary policy plays in cost-of-living divergence
Many papers looking at inflation inequality, see e.g. Jaravel (2021), Hobijn and Lagakos (2005)
Contributions to Literature

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- This paper makes three contributions:
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1. Construct an alternative housing cost measure
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1. Construct an alternative housing cost measure
2. Identify ultimate drivers (literature mostly focused on divergence along the income distribution)
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This paper makes three contributions:

1. Construct an alternative housing cost measure
2. Identify ultimate drivers (literature mostly focused on divergence along the income distribution)
3. Consider monetary policy as a driver
Data

- Consumer Price Indices from Bureau of Labour Statistics (BLS)
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- Monetary policy shocks: Kuttner (2001)
Outline of Presentation

1. Introduction
2. Group-specific CPIs
3. Ultimate Drivers
4. The Role of Monetary Policy
5. Conclusion
Section 2

Group-specific CPIs
Table: Illustration of group-specific CPI calculations

<table>
<thead>
<tr>
<th>Item</th>
<th>CPI</th>
<th>Weight (both)</th>
<th>Weight (A)</th>
<th>Weight (B)</th>
</tr>
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<tbody>
<tr>
<td>Food at home</td>
<td>105</td>
<td>0.5</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Electricity</td>
<td>110</td>
<td>0.2</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Footwear</td>
<td>97</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Group-specific CPI</td>
<td>-</td>
<td>103.6</td>
<td>104.1</td>
<td>103.1</td>
</tr>
</tbody>
</table>
Considerations for Group-Specific CPIs

Variable vs. fixed weights

Variable weights: more accurate at tracking true cost of living
Fixed weights: isolate price changes more clearly
Preferred: variable

Measuring housing costs
BLS measure of owners' cost: owners' equivalent rent (OER)
Good to measure price of "consumption goods"
Bad to measure cost of living, because it just tracks rents
Issue: rent and own costs can decouple considerably
Mortgage-based housing cost measure: principal + interest + maintenance + property taxes
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Housing Cost Measures

- Why can rent and own cost decouple? Because rent locked in for short time, while own cost is less flexible.
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- Illustration:

\[
\text{Housing price: } p_t = (1 + g) p_{t-1}
\]

\[
\text{Cost of renting: } c_{Rt} = \kappa p_t
\]

\[
\text{Cost of ownership: } c_{Ht} = \frac{1}{2} \sigma p_t + \frac{1}{2} \sigma p_{t-1}
\]

\[
\text{Own-to-rent cost: } c_{Ht}/c_{Rt} = \sigma^2 \kappa^2 + g^2 (1 + g)
\]

Implications:
- Ratio can diverge if housing price growth, cost-to-price ratio, or rent-to-price ratio change
- E.g. \( \frac{\partial c_{Ht}}{\partial g} < 0 \) implies higher housing price growth makes owning relatively cheaper

One conclusion of paper: low rates \( \rightarrow \) high housing price growth \( \rightarrow \) lower \( c_{Ht}/c_{Rt} \) \( \rightarrow \) lower inflation for owners
Why can rent and own cost decouple? Because rent locked in for short time, while own cost is less flexible

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- Cost of ownership: $c_t^H = \frac{1}{2} \sigma p_t + \frac{1}{2} \sigma p_{t-1}$

Implications:
- If housing price growth, cost-to-price ratio, or rent-to-price ratio change, the ratio can diverge.
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2005-2007: own cost relatively worse
Housing Cost Measures

- 2005-2007: own cost relatively worse
- 2008-2015: rent cost relatively worse
CPI by Age Group
Divergence Drivers by Age Group

Contributors to inflation by age group, 2010-2020 (variable weights)

Overall CPI inflation

Category
- Housing
- Education
- Health
- Household exp.
- Transportation
- Entertainment
- Clothing
- Food

-24: [Diagram Bar]
25-34: [Diagram Bar]
35-44: [Diagram Bar]
45-54: [Diagram Bar]
55-64: [Diagram Bar]
65-74: [Diagram Bar]
75+: [Diagram Bar]
CPI by Income Group

CPI by income since 2000 (variable weights, mortgage)

- Income percentiles:
  - 0-20th
  - 21-40th
  - 41-60th
  - 61-80th
  - 81-100th

Consumer Price Index

Year:
- 2000
- 2005
- 2010
- 2015
- 2020
Contributors to inflation by income percentile, 2010-2020 (variable weights)
CPI by Renter/Owner Status
Divergence Drivers by Renter/Owner Status

Contributors to inflation by housing status, 2010-2020 (variable weights)

Overall CPI inflation

Category
- Housing
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Renter

Owner
Section 3

Ultimate Drivers
Existing studies focusing on divergence by income, but why is this divergence happening?
What Factor Truly Matters?

- Existing studies focusing on divergence by income, but why is this divergence happening?
- Construct age/income/renter categories, e.g. young/rich/owners vs. old/rich/owners to isolate effect of each factor
Cost-of-living divergence is significant along age/income/housing lines.

- Renters/owner gap increased due to housing costs.
- Age gap increased due to health costs.
- Income mostly matters only through its correlation with housing/age.
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Section 4

The Role of Monetary Policy
Does monetary policy cause inflation divergence?
Estimating IRFs

- Does monetary policy cause inflation divergence?
- Estimate impulse response functions as

$$\Delta \frac{CPI_{t,i}}{CPI_{t,j}} = \alpha + \sum_{k=0}^{12} \beta_k MonShock_{t-k} + \epsilon_t,$$

where $CPI_{t,i}$ is CPI of group $i$ (e.g. renters are $i$, owners are $j$), $MonShock_{t-k}$ is a monetary policy shock $k$ months prior. The cumulative sums of the $\beta_k$ give the IRF $\beta_0$: effect of shock on impact $\beta_0 + \beta_1$: cumulative effect one month after impact $\beta_0 + \beta_1 + \beta_2$: cumulative effect two months after impact, etc.
Estimating IRFs

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Renters vs. owners (mortgage, variable weights)

Response of % CPI difference (percentage points)

Months after monetary shock
Age Group Divergence

55-64 vs. 25-34-year-olds (mortgage, variable weights)

Response of CPI difference (percentage points)

Months after monetary shock

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Income Group Divergence

21-40th vs. 81-100th income (mortgage, variable weights)

Response of % CPI difference (percentage points)
-0.020 -0.015 -0.010 -0.005 0.000 0.005

Months after monetary shock
0 2 4 6 8 10 12
Section 5

Conclusion
Conclusion

- Up to 0.6 p.p. annual inflation rate difference between groups

Key dimensions of divergence: age, income, housing status

Key items driving divergence: housing and health

Ultimate factors: renter/owner (for housing) and age (for health)

Monetary policy contributing to housing-related divergence, but not to health-related divergence

Especially health, but also housing likely plagued by structural issues:
  - Housing: regulations reducing housing supply (Glaeser and Gyourko, 2018), investment demand (Chen et al., 2012)
  - Health: lack of competition, other issues (Case and Deaton, 2020)
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