

# Do Falling Housing Prices Influence Labor-Market Slack? Evidence from the Household Side

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# Research Question & Positioning

- **Context:** China's 2021 housing-market correction created large negative housing wealth shocks.
- **Research Question:** Do falling housing prices influence labor-market slack through household labor-supply responses?
- **Mechanism:** Housing-price declines tighten household liquidity/debt constraints, potentially affecting employment and work hours.
- **Positioning:**
  - Adds a household-supply-side channel to a literature largely focused on demand-side effects.
  - Links macro housing shocks to micro labor decisions using merged CFPS-city panel.

# Methodology: Data & Variables

- **Household data:** China Family Panel Studies (CFPS, 2010–2022), including employment, income, debt, housing ownership, and demographic characteristics.
- **City-level data:**
  - Constructed panel of over 300 prefecture-level cities, 2010–2022.
  - *Housing prices* from the *China Real Estate Index System (CREIS)*.
  - *Vacancy* from the *Zhilian* hiring platform dataset.
  - *GDP per capita, urbanization, real estate investment, and population density* from official *provincial and municipal Statistical Yearbooks*.
- **Key variables:**
  - $y_{ict}$ : employment indicator (1 = employed), workhours (weekly).
  - $\ln P_{ct}$ : log city-level housing price.
  - $\text{DebtRatio}_{i,pre}$ : pre-shock debt-to-income ratio.
  - $\text{Slack}_{ct} : U/V$ , the inverse of market tightness (more unemployed workers per vacancy).
  - $\text{Tightness}_{ct} : V/U$ , standard measure of labor-market tightness.
  - $\text{Labor Force}_{ct} : E + U$ , total number of employed and unemployed workers.

# Methodology: Models

## Model Design

**Macro First-stage specification:**

$$\Delta \ln P_{ct} = \alpha + \beta_1 IV_{ct} + \lambda_c + \lambda_t + \varepsilon_{ct}$$

**Instrument:**

$$IV_{ct} = (\text{National housing price downturn}_t) \times \left( \frac{\text{Average real estate investment}_{c, 2015-2019}}{\text{Average GDP}_{c, 2015-2019}} \right)$$

**Second Stage:**

$$\Delta y_{ct} = \beta_1 \widehat{\Delta \ln P_{ct}} + \lambda_c + \lambda_t + \varepsilon_{ct}$$

**Micro Baseline regression:**

$$y_{ict} = \beta_1 \widehat{\Delta \ln P_{ct}} + \mathbf{X}'_{ict} \delta + \lambda_c + \lambda_t + \varepsilon_{ict}$$

**Micro Heterogeneity by household debt:**

$$y_{ict} = \beta_1 \widehat{\Delta \ln P_{ct}} + \beta_2 (\widehat{\Delta \ln P_{ct}} \times \text{DebtRatio}_{i, pre}) + \beta_3 \text{DebtRatio}_{i, pre} + \mathbf{X}'_{ict} \delta + \lambda_c + \lambda_t + \varepsilon_{ict}$$

# Macro Results: City-Level Responses

- **First stage strong:**  $F = 18.6$ ; instrument variable predicts housing price declines.
- **First stage:**
  - Labor force decreases as prices fall, likely driven by population flows and registration dynamics. No significant effects on unemployment, slack, or tightness.
- **Sectoral reallocation:**
  - Secondary sector (Manufacturing & Construction) employment share declines when housing price growth slows, while Primary(Agriculture & Mining) and Tertiary sector(service) employment expand.

# Macro Results Table 1

**Table 1. Effects of Housing Price Declines on Employment (2SLS)**

|                               | $\Delta \ln P_{ct}$ | Labor force          |
|-------------------------------|---------------------|----------------------|
| <b>Panel A: First Stage</b>   |                     |                      |
| $IV_{ct}$                     | -2.51***<br>(0.58)  |                      |
| F-statistic                   | 18.58               |                      |
| <b>Panel B: Second Stage</b>  |                     |                      |
| $\widehat{\Delta \ln P_{ct}}$ |                     | 201.62***<br>(95.39) |
| City FE                       | Yes                 |                      |
| Year FE                       | Yes                 |                      |
| <i>Observations</i>           | 3,346               | 2,339                |
| <i>Clusters (city)</i>        | 292                 | 285                  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are in parentheses and clustered at the city level.

# Macro Results Table 2

**Table 2. Effects of Housing Price Declines on Industrial Employment Shares (2SLS)**

|                               | $\Delta \ln P_{ct}$ | Primary             | Secondary           | Tertiary             |
|-------------------------------|---------------------|---------------------|---------------------|----------------------|
| <b>Panel A: First Stage</b>   |                     |                     |                     |                      |
| $IV_{ct}$                     | -2.51***<br>(0.58)  |                     |                     |                      |
| F-statistic                   | 18.58               |                     |                     |                      |
| <b>Panel B: Second Stage</b>  |                     |                     |                     |                      |
| $\widehat{\Delta \ln P_{ct}}$ |                     | -11.81***<br>(5.72) | 40.81***<br>(14.02) | -25.82***<br>(12.12) |
| City FE                       | Yes                 | Yes                 | Yes                 | Yes                  |
| Year FE                       | Yes                 | Yes                 | Yes                 | Yes                  |
| Observations                  | 3,346               | 2,406               | 2,462               | 2,460                |
| Clusters (city)               | 292                 | 284                 | 286                 | 286                  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are in parentheses and clustered at the city level.

- Housing-price declines have no strong average effects on the baseline employment or weekly work hours.

## **Household debt amplifies labor responses to housing shocks:**

- **Employment:** for more indebted households, employment is more strongly negatively related to predicted housing-price growth; housing price declines are associated with higher employment for these households.
- **Workhours:** households with higher debt-to-income ratios increase weekly work hours more when prices decline.

**Interpretation:** evidence consistent with a liquidity-constraint / debt-overhang mechanism operating on both margins.

# Employment Heterogeneity

**Table 3. Employment Heterogeneity by Household Debt**

|   | Employed <sub>ict</sub> |                   |
|---|-------------------------|-------------------|
| $\widehat{\Delta \ln P_{ct}}$                                 | -1.07***<br>(0.36)      | -0.90**<br>(0.44) |
| DebtRatio <sub>i,pre</sub>                                    | -0.00<br>(0.00)         |                   |
| DebtHigh <sub>i,pre</sub>                                     |                         | 0.03<br>(0.02)    |
| $\widehat{\Delta \ln P_{ct}} \times \text{DebtRatio}_{i,pre}$ | -0.14***<br>(0.02)      |                   |
| $\widehat{\Delta \ln P_{ct}} \times \text{DebtHigh}_{i,pre}$  |                         | -2.05**<br>(1.00) |
| City FE   | Yes                     | Yes               |
| Year FE   | Yes                     | Yes               |
| City-specific trend   | Yes                     | Yes               |
| <i>Observations</i>   | 1,431                   | 1,431             |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parentheses, clustered at the city level.

# Workhours Heterogeneity

**Table 4. Workhour Heterogeneity by Household Debt**

|   | Workhours <sub>ict</sub> |                   |
|---|--------------------------|-------------------|
| $\widehat{\Delta \ln P_{ct}}$                                 | 79.36<br>(53.43)         | 50.60<br>(61.46)  |
| DebtRatio <sub>i,pre</sub>                                    | -0.02<br>(1.11)          |                   |
| DebtHigh <sub>i,pre</sub>                                     |                          | -2.63<br>(2.29)   |
| $\widehat{\Delta \ln P_{ct}} \times \text{DebtRatio}_{i,pre}$ | -21.17**<br>(8.70)       |                   |
| $\widehat{\Delta \ln P_{ct}} \times \text{DebtHigh}_{i,pre}$  |                          | -47.46<br>(91.37) |
| City FE   | Yes                      | Yes               |
| Year FE   | Yes                      | Yes               |
| Individual controls   | Yes                      | Yes               |
| <i>Observations</i>   | 831                      | 831               |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parentheses, clustered at the city level.

# Implications & Limitations

## Implications

- Housing downturns reshape labor allocation across sectors rather than raising measured slack.
- Household debt plays a key role in mediating labor-supply adjustments.

## Limitations

- Only one post-2021 CFPS wave; limited dynamic analysis.
- Slack measurement coarse: city unemployment not public; vacancy data from single platform.
- Exposure varies across households despite city FE (homeownership, migration, within-city variation).
- CFPS lacks search intensity or reservation wage measures.