Housing Booms

• Many parts of the world have experienced booming housing markets in the last two decades
  – US, China, Singapore, etc.

• Policy relevant implications
  – Financial stability of households and banking system
  – Real consequences on future economic growth
    • Previous literature mainly focuses on the channel of consumption and investment
A Less Explored Channel

• Housing booms also affect individual’s labor market decisions
  – Educational choice
  – Labor market participation
  – Effort

• Loafing on the job is prevalent at work place
  – In 2014, 90% of American employees wasted time during work hours and close to 70% spent at least one hour unproductively every day (salary.com)
  – Cost employers hundreds of billions of dollars per year

• Research question:
  Do housing booms influence work effort?

• Productivity and economic growth
Leisure and Effort Choice

• Trade-off
  – Reward to effort: (permanent) income ↑ to afford higher consumption
  – Cost of effort: disutility (assuming strict preference for leisure)

• Housing booms alter effort incentives
  – The wealth channel: the “windfall” gain makes the reward to effort less appealing
    • Mostly for home owners/investors and wealthy individuals
  – The labor demand channel: “slack” labor market reduces the cost of shirking
    • Applicable for both homeowners and renters
Empirical Challenges

• Effort is hard to measure
  – Rarely studied
  – At best use survey answers or noisy proxies
  – Low frequency

• Identification challenge on house price movements
Our Setting

• Exploit China’s large and persistent housing booms

• Novel measure of effort
  – Taking care of personal needs during work hours
  – Measured at the individual level
  – High frequency

• (Multiple) shocks of house price
  – Empirical analysis relies on within-individual change after the house price shock
Preview of Findings

• After positive shocks to house prices, the propensity to observe personal use of credit cards during work hours increased significantly (by 8%)
  – Only present in the treated areas
  – No such effect among retirees and unemployed in the treated areas
  – Prevalent in the treatment population

• Immediate and permanent effect

• Concentrated among homeowners, especially those with higher housing wealth

• Implications for labor productivity
  – No evidence of work hours switching
  – Stronger in early mornings and right before lunch
  – Stronger on later days of week
  – Stronger among workers with low work incentive
Data

• Credit card holder population of a leading bank
  – Over 22 million credit card accounts from by the end of 2012, constituting 10% of China’s credit card market and covering all 32 provinces and municipalities in China
  – Individual-level monthly credit card statement information
  – Transaction-level data from 2008:01 to 2009:10: we observe the amount of transaction, location of transaction, transaction type, date and time stamp of transaction

• For a random sample of the card population, we obtain their demographics, e.g., age, gender, marital status, location, credit limit, ownership status, occupation, employment status, employer type, education, etc.
Analysis Sample

• Identify employed individuals
  – Excludes those in military service
  – Excludes supplementary card holders
  – Excludes unemployed and retiree population – falsification

• Focus on top 300 cities in the sample

• Keep active card user (CC activity for at least half of the sample period)

• Keep age between 22 and 80

• N = 202,778
Measuring Shirking

- **Idea**: to capture personal CC transactions made by employed individuals during work hours

- Credit card transactions on:
  - Spending on goods and services
  - Payment of financial services, government fees and utility bills (typically have to pay on-site)—over 30% of total transactions

- **Top 5 CC transaction type in sample (>70%)**:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Transaction Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,492,739</td>
<td>26.72</td>
<td>Onsite payment of financial services</td>
</tr>
<tr>
<td>2,219,610</td>
<td>23.79</td>
<td>Warehouse retailer</td>
</tr>
<tr>
<td>1,114,777</td>
<td>11.95</td>
<td>Department store</td>
</tr>
<tr>
<td>440,147</td>
<td>4.72</td>
<td>Fee payment</td>
</tr>
<tr>
<td>368,246</td>
<td>3.95</td>
<td>Restaurant</td>
</tr>
</tbody>
</table>
Measuring Shirking

• Work hour:
  – Mondays-Fridays: 9am-12pm, 2pm-5pm
  – Excludes weekends and public holidays
  – Excludes days individuals make CC transactions out of town

• Personal (non-work-related) transactions

• Main measure: dummy for non-work-related CC transactions during work hours

• Novelty: High frequency measure that detects distraction from work based on actual behavior
  – Does not capture all other shirking behavior such as personal phone call or social media
  – Does not account for other unobserved heterogeneity across individuals (e.g., work schedule)
  – Direct comparison of this measure across individuals is inappropriate

• Need exogenous variation in house price and study within-individual change
Shocks to House Price: “Land King”

• Land auctions:
  – Government owns land and holds open auctions to sell land
  – Record winning price—”Land King” (地王)

• Widely reported, salient events
  – Aggregates developer’s projection of future house prices
  – Viewed as a bullish signal of local house price
  – Covered in news media and update people’s prior

• Quite common in various Chinese cities since the late 1990s
Shocks to House Price: “Land King”

- **Identifying assumption**: Precise timing and precise city being awarded as “Land King” plausibly exogenous to individuals
  - Will explicitly test the parallel trends

- Three cities have nation-wide record high (unit) transaction price for residential land parcels in our sample period (Wu, Gyourko, and Deng, 2015)
  - Shanghai, August 27 2008
  - Hangzhou, August 18 2009
  - Xiamen, September 8 2009
Validity of the Land King Shocks

- Significant price increase after the Land King events
  - 5% per month
  - Similar results using DID
- No abnormal price change right before the shocks
  - Precise timing and city of Land Kings are unanticipated
Empirical Methodology

• Treatment: individuals in Shanghai, Hangzhou, and Xiamen

• Control group: to estimate the counterfactual
  – All others who are matched on observables – main analysis
  – All others in the sample
  – All others in the adjacent provinces: Jiangsu, Zhejiang, Fujian, Guangdong

• Our empirical model is as follows
  \[ Y_{i,t} = \delta_t + \alpha_i + \beta_{\text{post}} D_{i,\text{post}} + \epsilon_{i,t} \]
  \[ Y_{i,t} = \delta_t + \alpha_i + \beta_{\text{pre}} D_{i,(-1m,-1m)} + \beta_{\text{evt}} D_{i,0m} + \beta D_{i,\text{post}} + \epsilon_{i,t} \]
  – We control for individual fixed effects, (industry specific and employer type specific) year month fixed effects
  – All standard errors are clustered at the city level (i.e., the shock level)
### Average Response

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<tbody>
<tr>
<td><strong>Work-hour personal transactions dummy</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>$1_{-1m,-1m}$</td>
<td></td>
<td></td>
<td>0.0047</td>
<td>0.0047</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(0.68)</td>
<td>(0.65)</td>
</tr>
<tr>
<td>$1_0$</td>
<td>0.0049</td>
<td>0.0040</td>
<td></td>
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<tr>
<td></td>
<td>(0.88)</td>
<td>(0.73)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1_{post}$</td>
<td>0.0170***</td>
<td>0.0175***</td>
<td>0.0181***</td>
<td>0.0186***</td>
</tr>
<tr>
<td></td>
<td>(3.35)</td>
<td>(3.53)</td>
<td>(3.11)</td>
<td>(3.28)</td>
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<tr>
<td>Individual FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Year-month FE</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<tr>
<td>Industry year-month FE</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Employer type year-month FE</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
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</table>

- F-test rejects the null that $1_{post} = 1_{-1m,-1m}$
- The increase is equivalent to 8% of the treatment group’s pre-shock mean (21.3%)
Driven by Local Economic Conditions?

- Falsification test
- Focus on two adjacent provinces—Jiangsu and Zhejiang—during the one year period after the first shock (in Shanghai)
- Control: other unaffected provinces

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</tr>
<tr>
<td><em>Jiangsu &amp; Zhejiang</em>&lt;sub&gt;−1m,−1m&lt;/sub&gt;</td>
<td>0.0012</td>
<td>-0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(-0.02)</td>
<td></td>
<td></td>
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<tr>
<td><em>Jiangsu &amp; Zhejiang</em>&lt;sub&gt;0&lt;/sub&gt;</td>
<td>-0.0070</td>
<td>-0.0059</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.23)</td>
<td>(-1.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Jiangsu &amp; Zhejiang</em>&lt;sub&gt;post&lt;/sub&gt;</td>
<td>-0.0009</td>
<td>-0.0002</td>
<td>0.0003</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td>(-0.12)</td>
<td>(-0.03)</td>
<td>(0.04)</td>
<td>(0.07)</td>
</tr>
</tbody>
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Reflect Trend in Credit Card Use?

- Treatment group could use credit card disproportionately more
  - Should see higher likelihood of using credit card, as opposed to other instrument
  - Should also see higher credit card activity outside work-hours

<table>
<thead>
<tr>
<th></th>
<th>(1) Credit card use dummy</th>
<th>(2) Credit card transactions in non-work hours dummy</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1_{-1m,-1m}$</td>
<td>0.0056</td>
<td>0.0062</td>
</tr>
<tr>
<td></td>
<td>(0.80)</td>
<td>(0.81)</td>
</tr>
<tr>
<td>$1_0$</td>
<td>0.0002</td>
<td>0.0010</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>$1_{post}$</td>
<td>-0.0025</td>
<td>-0.0025</td>
</tr>
<tr>
<td></td>
<td>(-0.80)</td>
<td>(-0.77)</td>
</tr>
<tr>
<td></td>
<td>-0.0034</td>
<td>-0.0034</td>
</tr>
<tr>
<td></td>
<td>(-1.45)</td>
<td>(-1.43)</td>
</tr>
<tr>
<td></td>
<td>-0.0077***</td>
<td>-0.0076***</td>
</tr>
<tr>
<td></td>
<td>(-3.33)</td>
<td>(-3.30)</td>
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Is This a Work Effort Response?

- Or behavioral changes in credit card use behavior (e.g., by spouse)
  - **Falsification test**: Response among retirees and unemployed:

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</tr>
<tr>
<td>$1_{-1m,-1m}$</td>
<td>0.0359</td>
<td>0.0408</td>
<td>(0.87)</td>
<td>(0.90)</td>
</tr>
<tr>
<td>$1_0$</td>
<td>0.0066</td>
<td>0.0053</td>
<td>(0.26)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>$1_{post}$</td>
<td>-0.0141</td>
<td>-0.0129</td>
<td>-0.0106</td>
<td>-0.0091</td>
</tr>
<tr>
<td></td>
<td>(-1.33)</td>
<td>(-1.18)</td>
<td>(-0.61)</td>
<td>(-0.49)</td>
</tr>
</tbody>
</table>
Distribution of the Response

- Mean (median) change = 1.6% (2.7%) ; pre-shock mean = 21.3%
- 60% treated with positive change
- Cannot be explained by people quitting their jobs (and consume leisure without shirking)
- Further alleviates change of credit card user story
The Wealth Channel

• The wealth channel: predicts the effort reduction effect to concentrate among home owners, especially those with higher housing wealth.

• Study the differential effect between non-home owners and home owners

• Study the heterogeneity within homeowners based on proxies of housing wealth
## Owners vs. Renters

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<td>Work-hour personal transactions dummy</td>
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<tr>
<td></td>
<td>0.0035</td>
<td>0.0045</td>
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<tr>
<td></td>
<td>(0.75)</td>
<td>(0.93)</td>
<td></td>
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</tr>
<tr>
<td>$l_{post} \times \text{Own}$</td>
<td>0.0177***</td>
<td>0.0178***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(24.53)</td>
<td>(11.88)</td>
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<td></td>
<td>Work-hour personal transactions dummy</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>0.0114**</td>
<td>0.0134**</td>
<td>0.0199***</td>
<td>0.0215***</td>
</tr>
<tr>
<td></td>
<td>(2.17)</td>
<td>(2.34)</td>
<td>(3.53)</td>
<td>(3.66)</td>
</tr>
<tr>
<td>$l_{post} \times \text{High credit limit}$</td>
<td>0.0120***</td>
<td>0.0114***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.72)</td>
<td>(5.29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$l_{post} \times \text{Multiple homes}$</td>
<td>0.0381***</td>
<td>0.0388***</td>
<td></td>
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<tr>
<td></td>
<td>(5.15)</td>
<td>(4.66)</td>
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The Labor Demand Channel

• Labor market response reduces cost of shirking
  – Land Kings may lead to more employment opportunities
  – Firm response: invest in real estate and leaves less work for employees

• Less likely
  – should apply for both owners and renters

• These explanations also imply a lagged response
  – Firm and market response generally takes some time
Dynamic Response

- Average monthly response

Months after the shock

-1 0 1 2 3 4 5 6 7 8 9 10 11 12
Productivity Implication

• Maybe people change their work hours
  – Implies reduction of credit card use in other hours (8-9am, 12-2pm, 5-9pm)
  – We find no evidence of changing work hours

• Moreover, the intensity of using work hours to take care of personal matters is stronger
  – In the early morning hours
  – Near lunch
  – During the later days of the work week
Becoming More Efficient?

• Achieve more in shorter hours of work
• Attending to personal matters does not hurt productivity
  – If we observe a stronger effect among workers with greater reward to effort
• Proxy of work incentives
  – Older, near retirement employees: Option value of effort is small
  – Especially among SOE employees
• Finding: stronger effect among older employees, particularly when they work at SOE
Additional Analysis

• Alternative pre-trend windows

• Alternative control group
  – Geographically proximate provinces—Jiangsu, Zhejiang, Fujian, Guangdong
  – Full sample analysis

• Alternative shirking measure
  – Stricter def. of non-work-related transaction
  – Use work-hour spending on retailer, department store, movies/theatre and spa
  – # of non-work-related personal transactions

• Results are very similar
Concluding Remarks

• The first paper to study the (real) impact of housing booms on work effort
  – Novel measure of effort at high frequency
• Significant increase in shirking after positive shocks to house prices
• Effect concentrated among homeowners
• New insight on the real impact of housing booms through the labor productivity channel
  – Our results imply an elasticity of work-hour shirking propensity with respect to house prices of 1.6
  – Input for housing (price) regulation