

# The Marginal Propensity to Extract Housing Wealth: Evidence from Home Equity Windfalls

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Seamus Lawton provided excellent research assistance. The analysis and conclusions set forth are those of the author and do not indicate concurrence by other members of the research staff or the Board of Governors

# Housing wealth and spending

- US households own:
  - ~\$45 trillion of owner-occupied, residential real estate
  - ~\$30 trillion in home equity
- Housing wealth is the most important balance sheet item, especially among middle-income families
- This wealth can support spending
- However, home equity is quite illiquid

**Question: How willing and able are households to extract it?**

# This paper

- Uses novel data set to estimate marginal propensity to extract home equity
  - Task complicated by endogeneity of housing wealth to other determinants of spending, both on individual and regional level
- To obtain consistent estimates, exploits individual variation in housing wealth shocks at loan origination. Namely:
  - Some homebuyers receive appraisals exceeding purchase value, generating positive equity cushion available for withdrawal
  - Shows evidence that shock appears to be assigned at random
  - Compare outcomes relative to the control group that did not receive the shock
- Estimates fraction of this excess equity that borrowers withdraw
  - Extraction through HELOC, 2<sup>nd</sup> lien mortgage, and cash-out refi

# Preview of results

- Homeowners extract
  - 4% of marginal equity in first year following receipt of the shock
  - Effect cumulates in subsequent years and flattens by year 6
  - Overall: 13% of marginal equity extracted cumulatively over 7-year period
- Withdrawn equity likely used for spending
  - Not used for de-leveraging on other forms of debt

# Contribution to literature

- **“First-generation”** papers: cross-sectional and time-series correlational studies for US, UK, EU
  - Subject to endogeneity concerns
- **“Next-generation”** papers: aim to address endogeneity by exploiting market-level variation in house prices
  - Often **instrumenting with local housing supply elasticity** (sometimes interacted with interest rates): Mian and Sufi (2011), Mian, Rao and Sufi (2014), Aladangady (2017)
  - But also using other approaches such as relative changes in the price of a particular home characteristics prevalent in local markets (Graham and Makridis, 2023) for the U.S.
  - **Concerns about bias from local economic trends remain**
- Recent papers also exploit individual-level variation in housing gains in U.K. and EU
  - I.e., changes in house price valuations between refinancing events in UK (Cloyne et al., 2019); unanticipated changes in housing wealth in self-reported Danish longitudinal data (Andersen and Leth-Petersen, 2021)
- Beyond identification, **notable differences in definition of dependent variable** (from nondurable consumption to total consumption to equity extraction to leverage) and **timing of effect** (instantaneous response vs cumulative response over several-year horizon)

# Data

- Start with loan-level single-family data from FHA
  - All FHA loans originated over 2007-2015
  - Borrower and property characteristics, purchase and appraised property values
  - Construct our measure of excess equity
- Merge with loan servicing and credit bureau records from Equifax Credit Risk Insight Servicing McDash (CRISM) data
  - 3.9 million loans uniquely matched in FHA and CRISM
  - Match on FICO at origination, loan amount, origination date, tract/ZIP
  - Can observe equity extraction and non-mortgage borrowing from initial home purchase to 6 month after mortgage termination
- To measure equity extracted from a home sale and to identify equity extraction originations that may be missing in CRISM, merge with deeds data (Cotality)
  - Match on loan amount, origination month, ZIP
  - Observe any subsequent sale price, liens associated with the borrower
  - **1.4 million unique home purchases that we can link among FHA, CRISM, and Cotality**

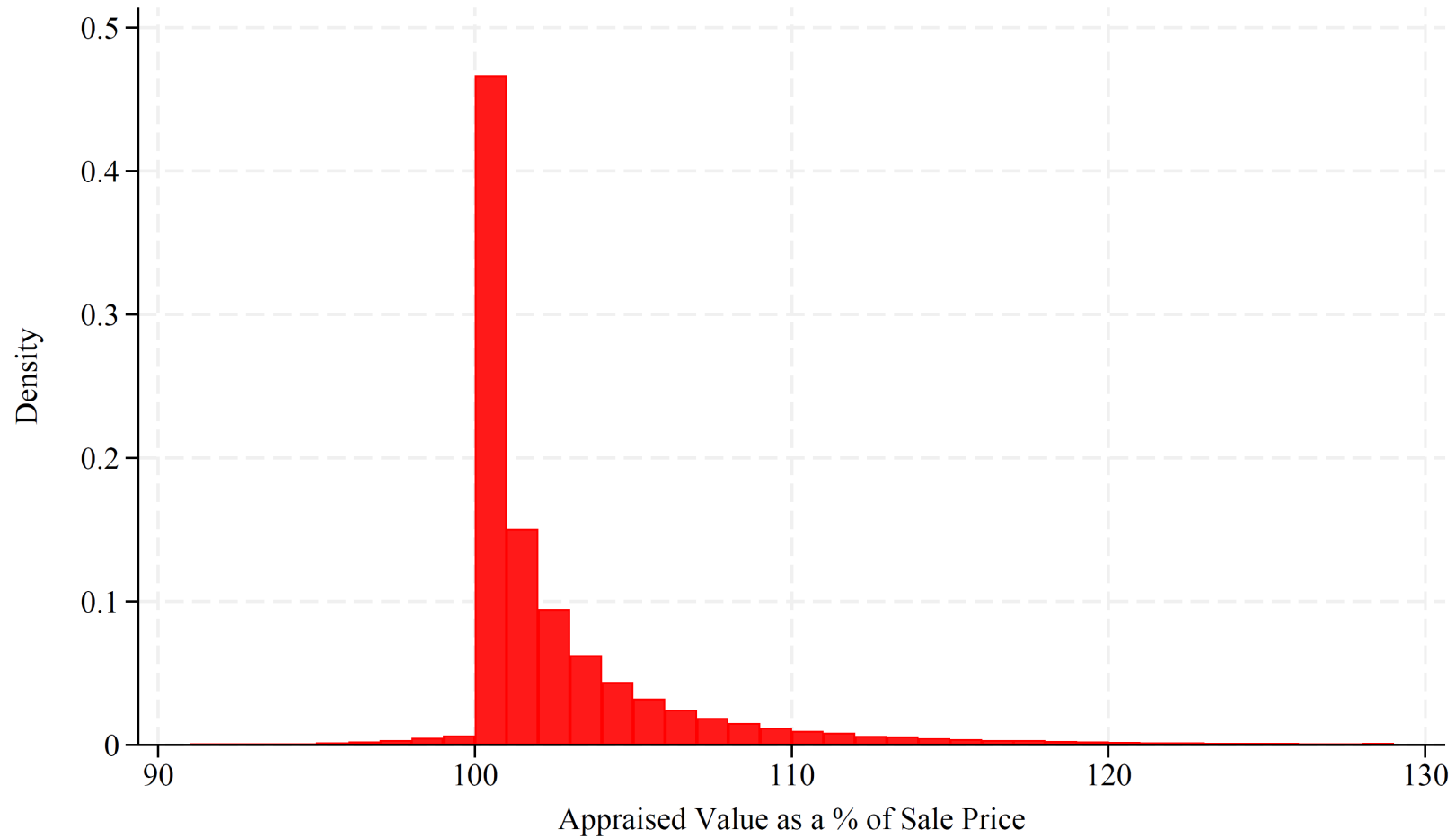
# Constructing Excess Equity

- Shock to housing wealth when household buys home priced below true market value
- Measure “true” value as professional appraisal at origination
  - Will show that appraisals accurate when they positively deviate from sale price
  - Will argue that getting a good deal almost 100% luck (i.e., shocks are exogenous)
- FHA borrowers have very high LTVs → little access to equity beyond that offered by excess equity
- Will show that this excess equity can be seen as windfall

# Background on appraisals

- Required to support valuation in LTV calculation for mortgage approval
  - LTV denominator is minimum of purchase price and appraised value
- Conducted by 3<sup>rd</sup> party professional appraiser
  - Observe contract price
  - Compare to other recent, nearby sales of similar homes, and arrive with appraised value
- Sale may fall through if appraisal < contract price
  - Can provide adverse incentive to appraise properties at contract price or can lead to purchase price renegotiations
- However, no clear incentives to appraise homes **above** purchase value
- Appraisal cannot be reused for subsequent equity extraction loan

# Appraised value vs. sale price



# Is this excess equity real?

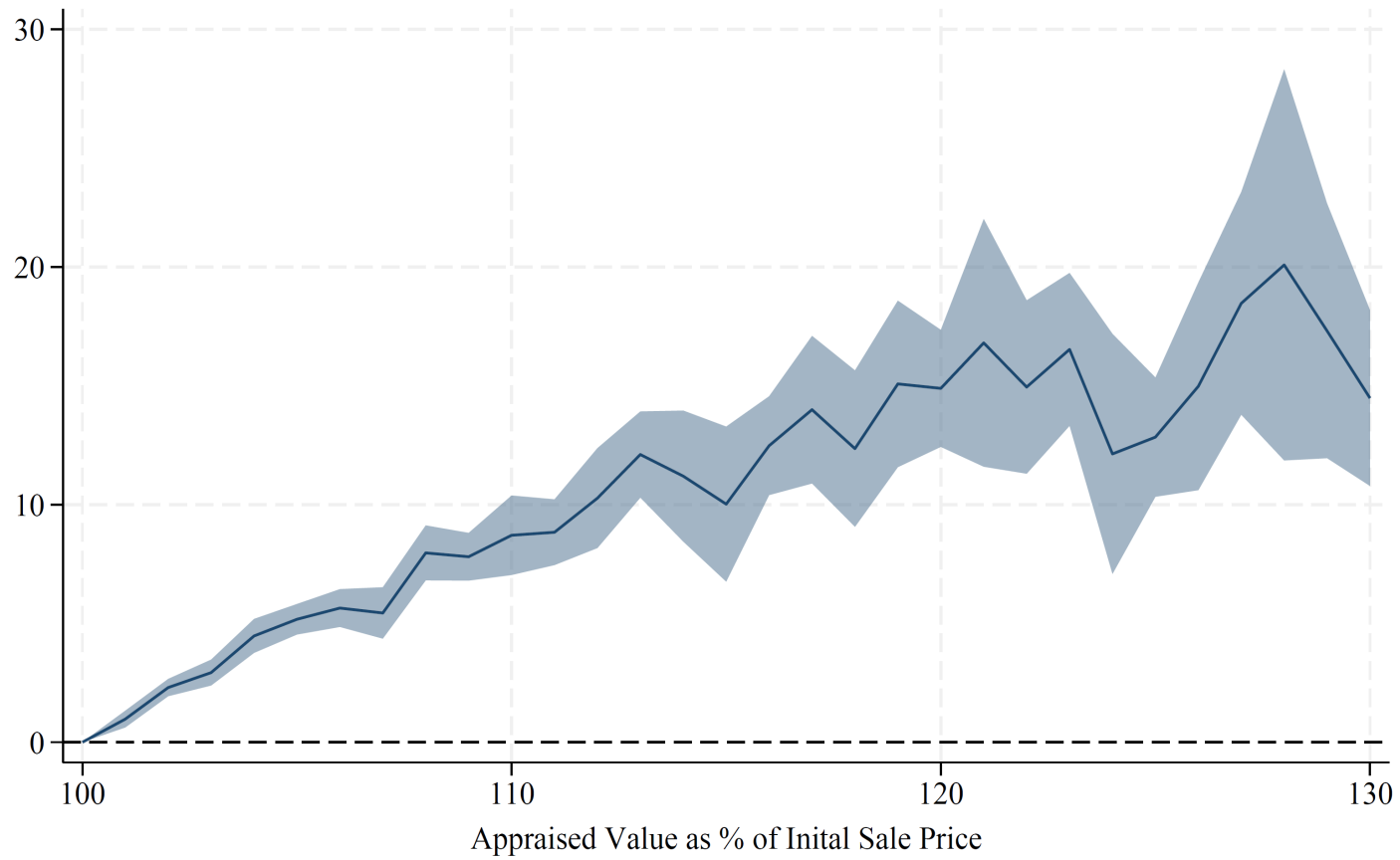
- Define  $EE = \frac{\text{Appraised Value}}{\text{Sale Price}_{\text{Initial}}} \cdot 100$
- Estimate semi non-parametrically the predictive power of excess equity for subsequent sale price:

$$\ln(\text{Sale Price}_{\text{subsequent}}) = \sum_{d=100}^{130} \beta_d \mathbf{1}[EE_i = d] + X_i + \varepsilon_i$$

Where X includes

- Log initial sale price
- National house price growth b/w initial and subsequent sale dates
- County-by-time ( $c,t$ ) fixed effects, and borrower characteristics at origination (FICO, first-time homebuyer, income) introduced in flexible way

# Excess equity and subsequent sale prices



# Who gets excess equity?

- Are certain borrowers more likely to get below-market deals?
  - Savvy buyers?
  - Jiang and Zhang (2025): mispricing more likely for lower-income buyers
    - Buy older, smaller homes with fewer comps

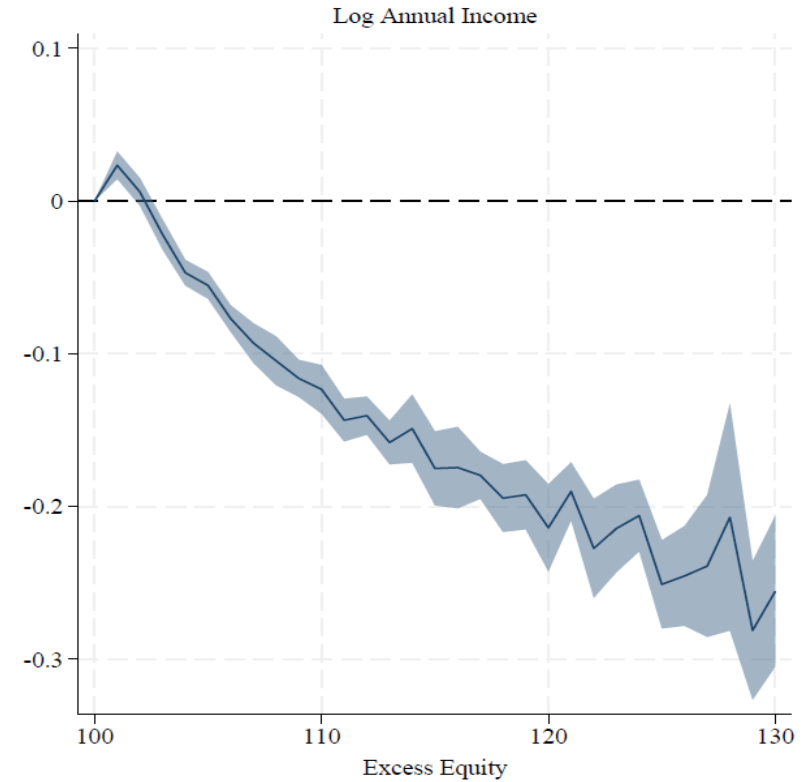
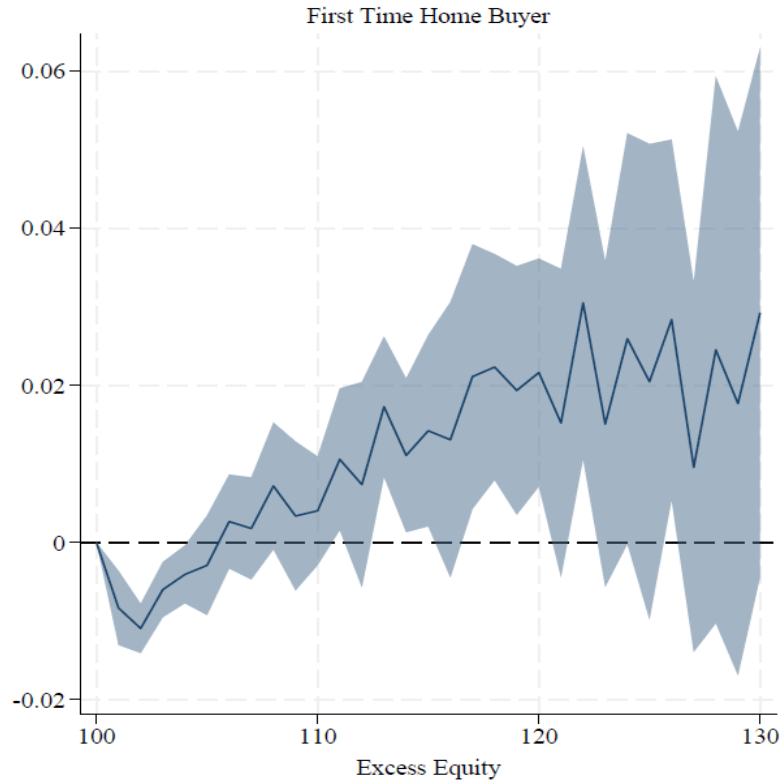
- Estimate:

$$X_i = \sum_{d=100}^{130} \beta_d \mathbf{1}[EE_i = d] + \theta_{c,y} + \varepsilon_i$$

where

- $X$  are borrower characteristics at origination (FICO at origination, first-time home-buyers, income at origination)
- $\theta$  are county-by-time ( $c,t$ ) fixed effects
- Errors clustered at county level

# Excess equity and borrower characteristics



**Upshot:** Borrowers receiving excess equity windfall do not look more financially savvy

# Estimation: Marginal Propensity to Extract (MPE)

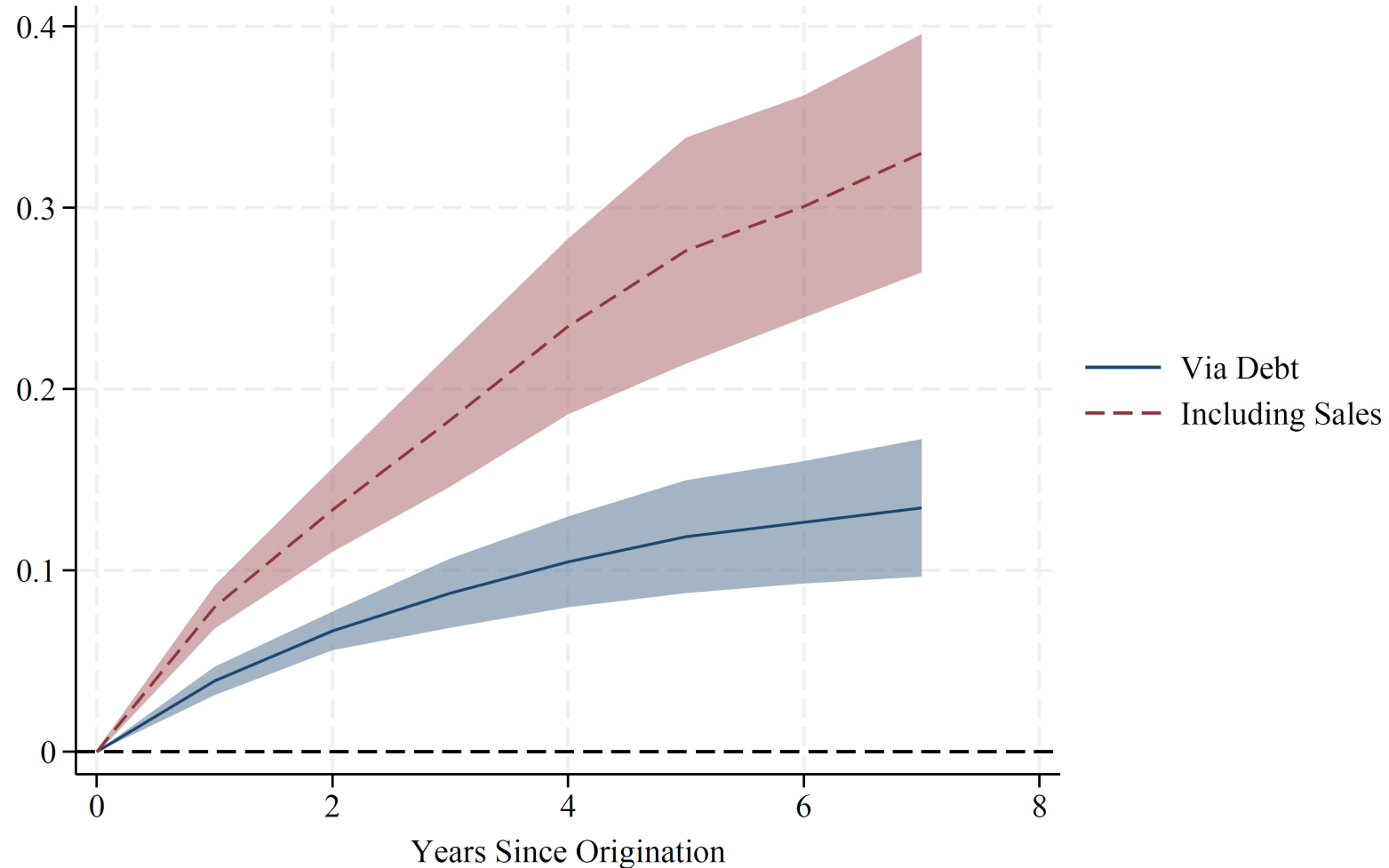
- Since the estimated relationship between equity windfall and equity extraction is linear (not shown), across years, we estimate linear effect of  $EE$ :

$$Y_{i,t} = \sum_{\tau=0}^7 \beta_{\tau} EE_i \mathbf{1}[t = \tau] + \delta_{c,y,t} + \gamma_{X,t} + \varepsilon_i$$

where  $Y_{i,t}$  measures the amount of equity extracted (in dollars) and  $EE_i$  measures excess equity (in dollars)

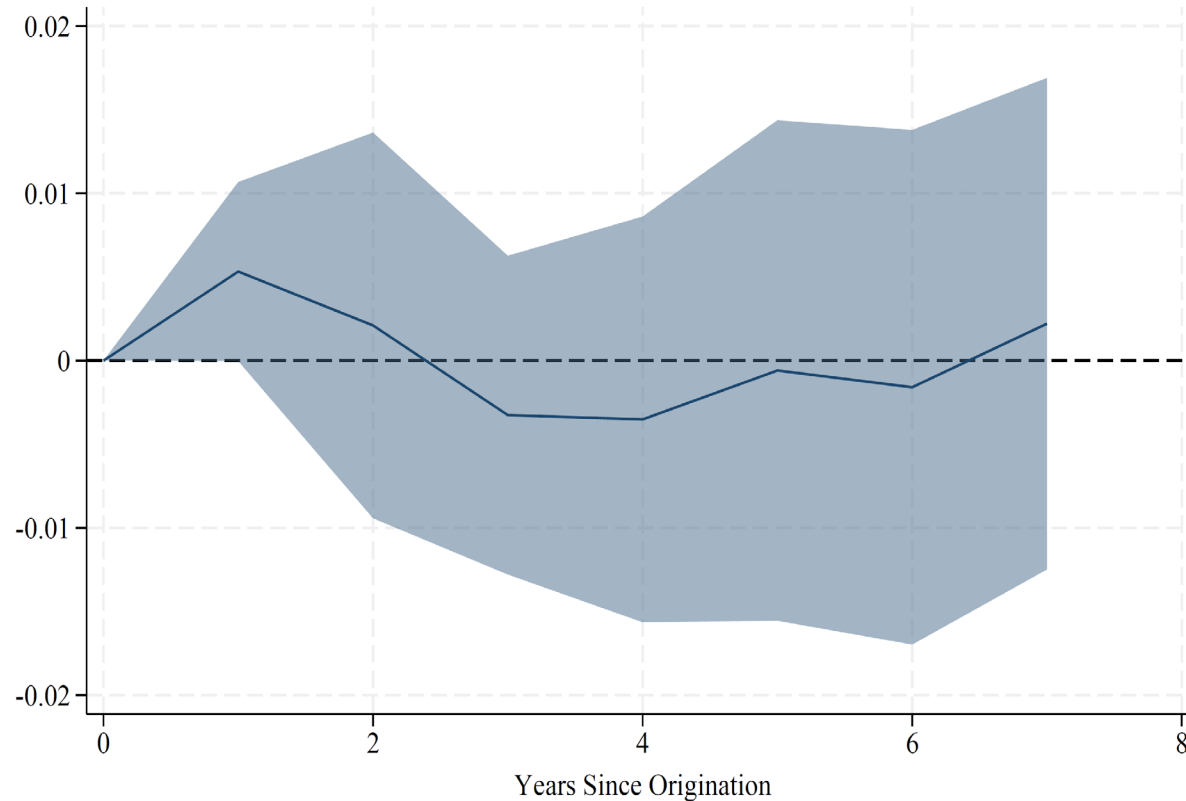
# Marginal propensity to extract, by year, method

MPE measured through pure equity extraction (excluding equity extracted through future sales) is the most tightly linked to marginal propensity to spend (MPX)



# Uses of extraction: Is excess equity used to pay down other debt

- No effect of excess equity on non-mortgage net borrowing



# Conclusion

- 4% of equity extracted via equity borrowing in the first year
- 13% of equity extracted via borrowing over 7-year period
- Home equity has increased ~\$15 trillion since 2020
  - Could support trillions in spending in coming decade
- Implications for monetary policy
  - Equity withdraw happens gradually over time

# Non-parametric Estimation

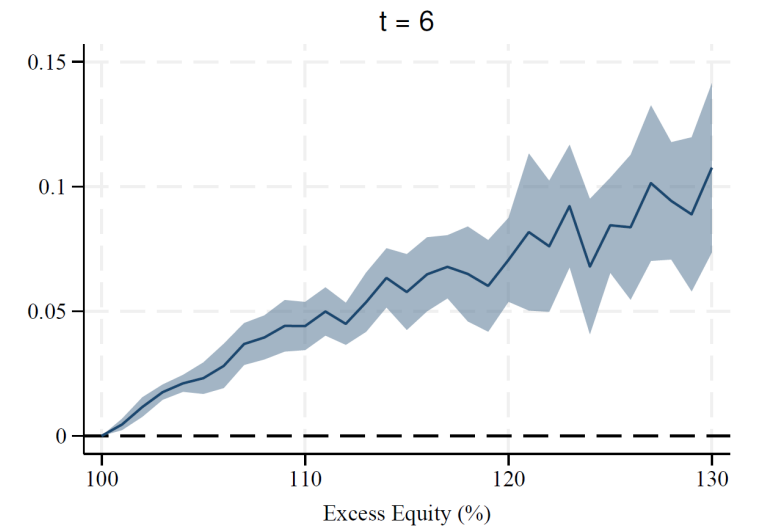
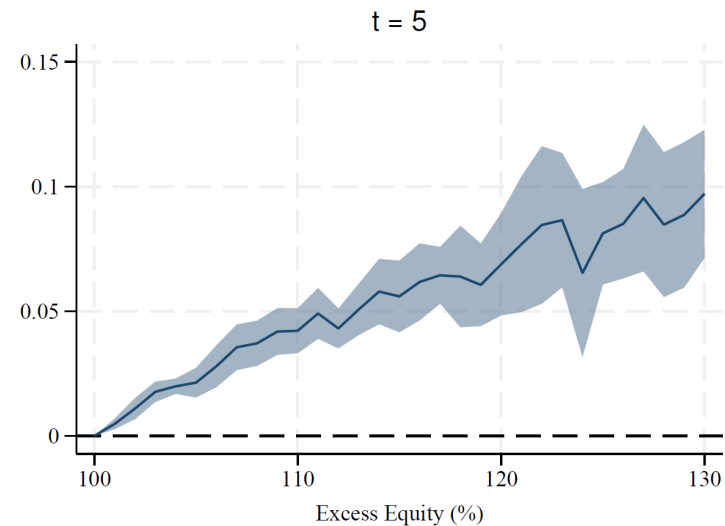
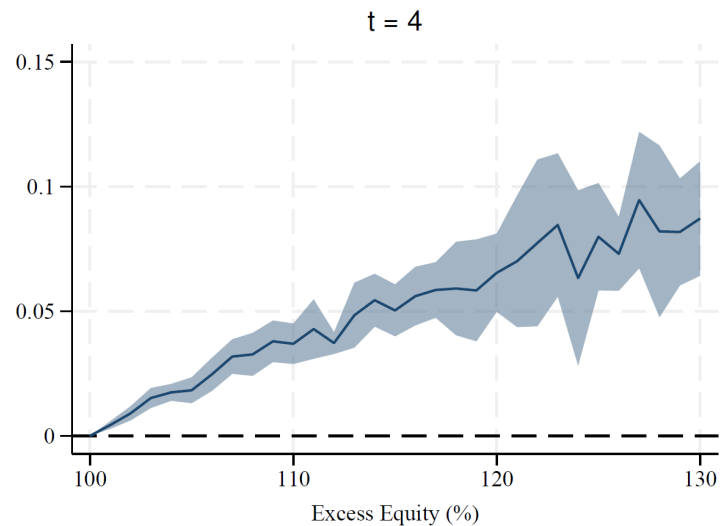
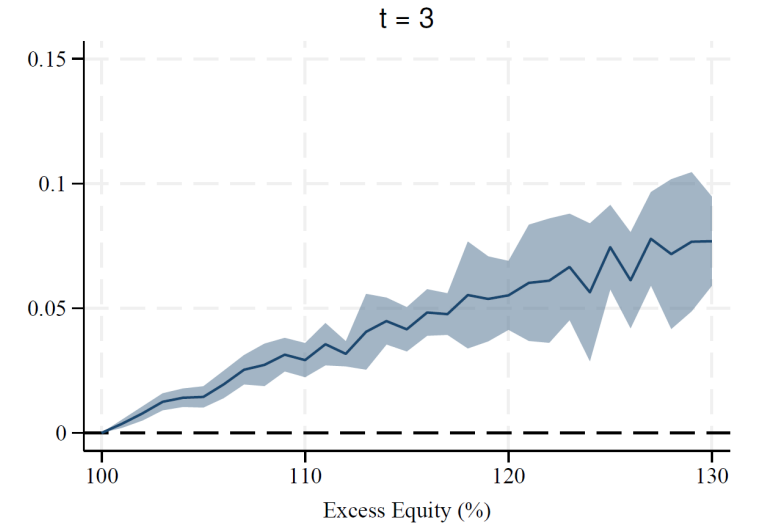
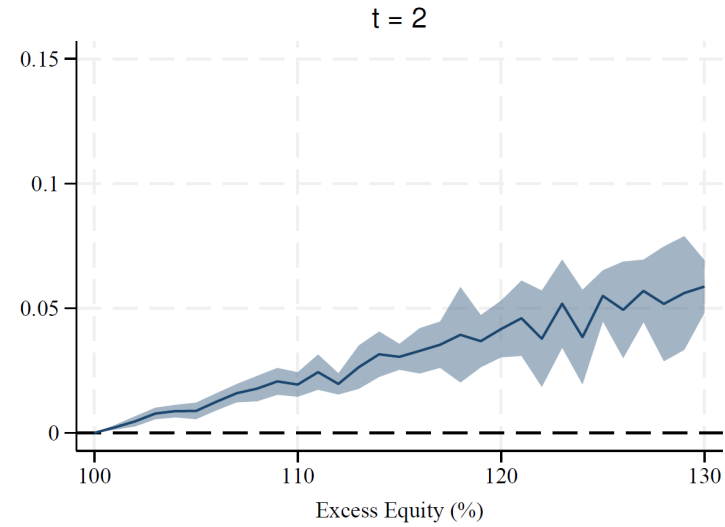
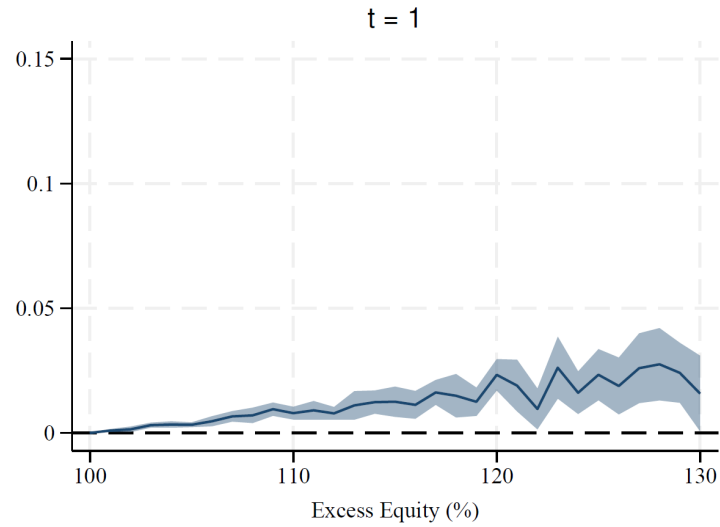
- Within year, estimate semi non-parametric effect of  $EE$ :

$$Y_{i,t} = \sum_{d=100}^{130} \beta_{d,t} \mathbf{1}[EE_i = d] + \theta_{c,y,t} + \varphi_{X,t} + \varepsilon_i$$

where  $Y_{i,t}$  is equity extraction;  $\theta_{c,y,t}$  are county-by-time FEs;  $\varphi_{X,t}$  is a set of controls; and  $t=\{1,\dots,7\}$  is years since origination.

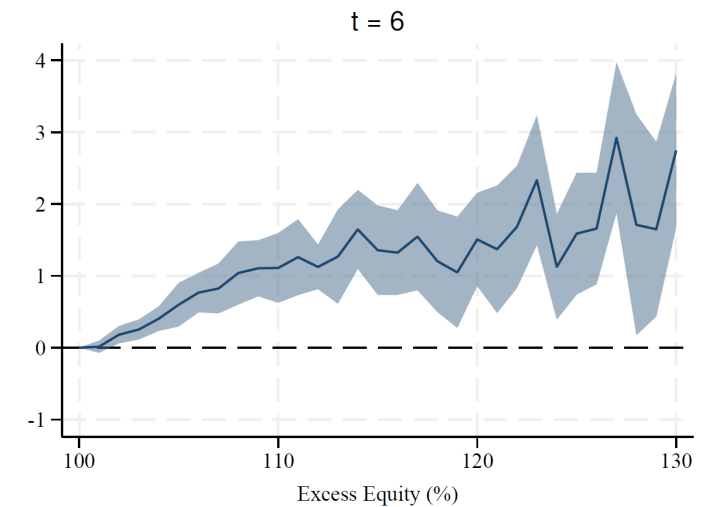
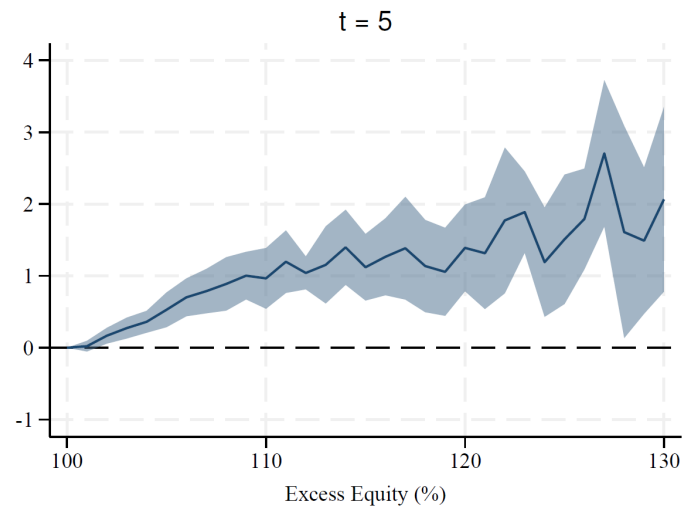
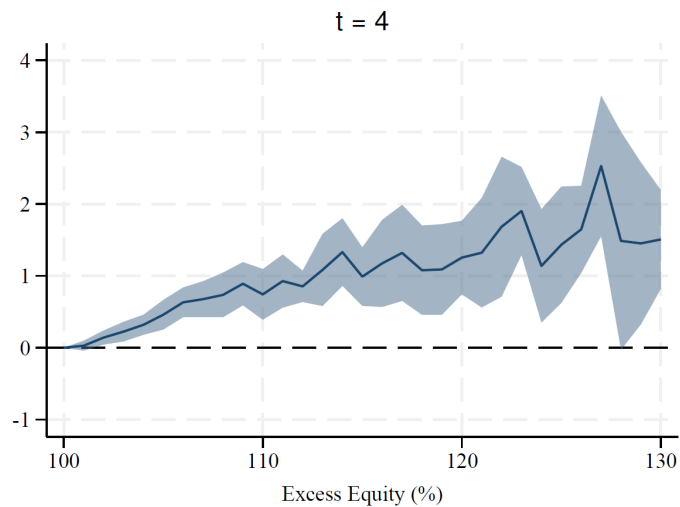
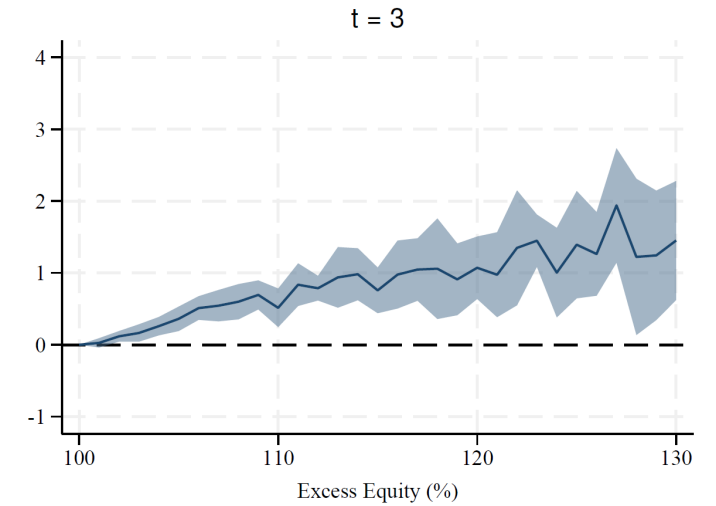
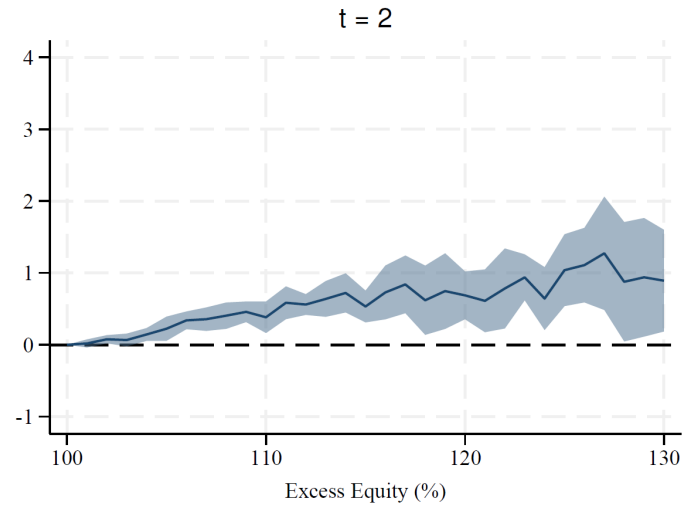
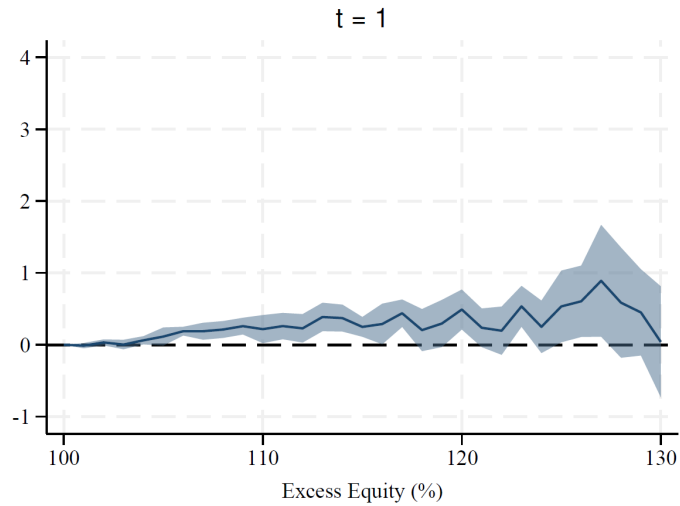
# Effect of equity on extensive margin borrowing

Probability of having engaged in equity extraction within t-years of purchase as a function of excess equity (measured as appraised value as a percentage of sales price)

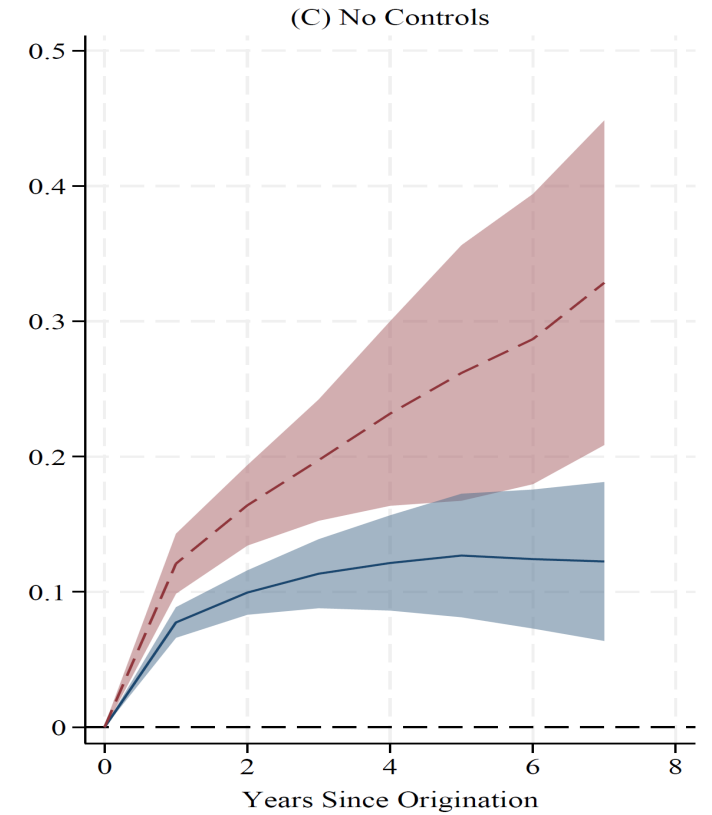
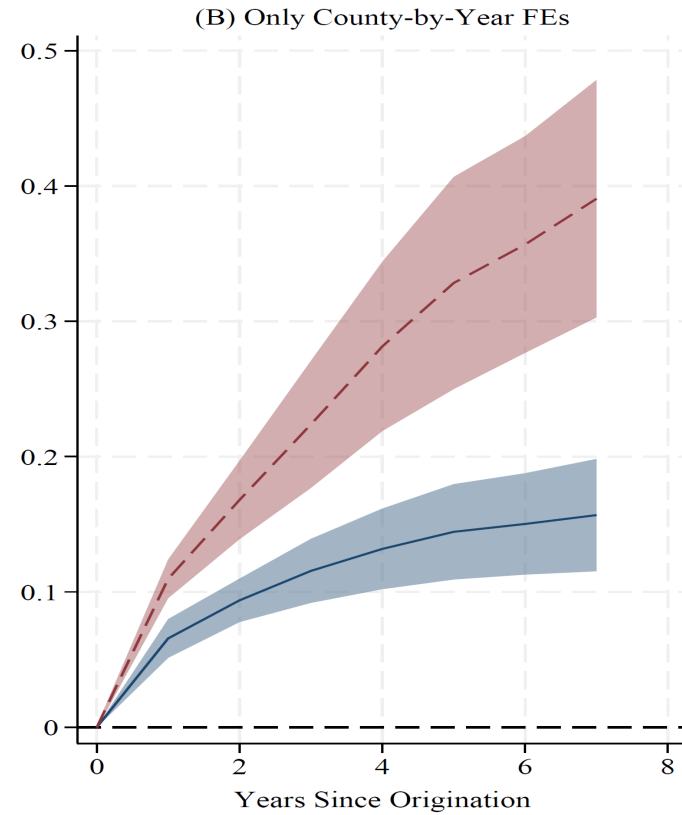
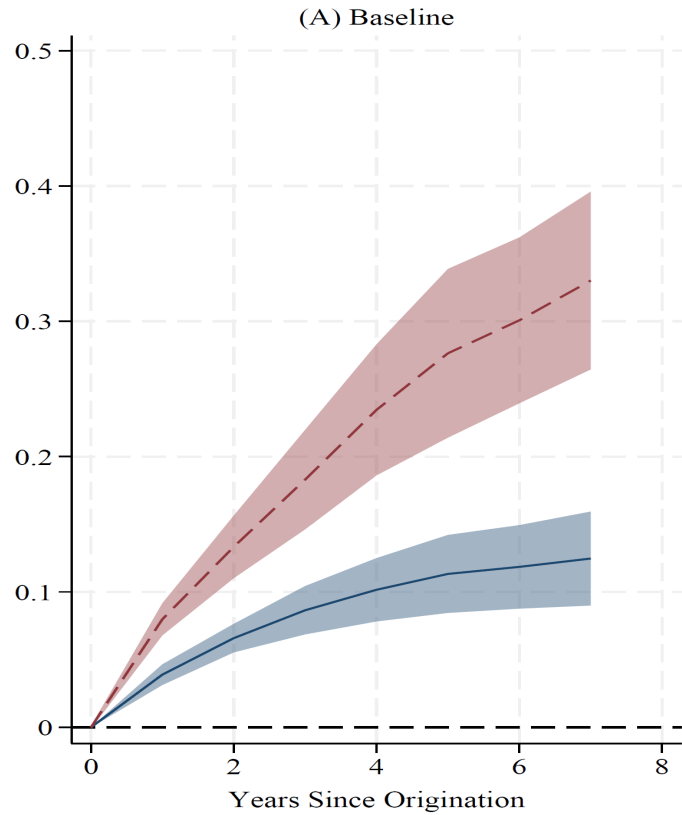


# Effect of equity on intensive margin borrowing

Amount of total equity extraction (measured as a percentage of sales price) within t-years of purchase as a function of excess equity (measured as appraised value as a percentage of sales price)



# Robustness of MPE to controls



Results invariant to inclusion of controls → evidence of random assignment of the excess equity shock (results not driven by a particular group)

# Effect of equity on moving

