Why Do Borrowers Default on Mortgages? A New Method For Causal Attribution

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[1] The views expressed are those of the presenter and not necessarily those of the Bank of England, the MPC, the FPC or PRC.

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Life Events

- Adverse events $\Longrightarrow$ mortgage payments too high relative to income
- Default (3 missed payments) possible even with **positive home equity**
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Issues

- Difficult to measure all life events; mortgage affordability
- Policy implications on principal vs payment reduction

This Paper

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1. Above-water defaults are due to life events
2. Income is a noisy measure of life events
3. Average fall in income same for above/below water borrowers after life event

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Evidence:

- Income path prior to default very similar for above and below water defaulters
  $\Longrightarrow$ **Almost all below water defaults due to life events too**
- Estimate: only 3% of defaults strategic; little variation until very high LTV
- Bhutta et al. [2017]: 25%(50%) of defaults are strategic at LTV of 148%(174%)

Evaluation

- Great contribution combining novel methodology and data
- Sharp empirical results on minimal role of strategic default
- Further support for effectiveness of payment over principal reduction (Ganong and Noel, 2020)
- Doesn't imply *ex ante* LTV regulation ineffective
  - could still limit default, loss given default, and consumption responses

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  - could still limit default, loss given default, and consumption responses
- **Discussion**:
  - Measurement error in LTV
  - What *is* strategic default?
  - Validity of theoretical assumptions

A. Measurment Error in LTV

- Regressing default on noisy measure of life event $\Longrightarrow$
  - Attenuation bias, underestimate importance of life events
  - Overestimate role of strategic default

This paper: estimate income path prior to default for above/below water:

$$\frac{Income_t}{\bar{Income}_{pre}} = \lambda + \kappa \mathbb{I}\left(LTV > 100\right) + \gamma \mathbb{I}\left(t = -2, -1, 0\right) + \beta \mathbb{I}\left(t = -2, -1, 0\right) \mathbb{I}\left(LTV > 100\right) + \varepsilon$$

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- Noise in life event moved to LHS, but noise in LTV dummy remains:
  - Difference between estimated house prices and sale prices: s.d. $\approx 20\%$
  - This error may be higher in when markets are less liquid (Giacoletti, 2021)
  - Also difference between estimated house prices and *perceived* house prices
- Attenuation bias for the LTV coefficients
  - $\Longrightarrow$ **underestimate** strategic default

A. Measurment Error in LTV

- **Possible solution #1:** alternative definition of above water (in paper)
- **Possible solution #2:** restrict sample based on time since house purchase
- **Possible solution #3:** Use Instruments for

$$\mathbb{I}(LTV > 100), \quad \mathbb{I}(t = -2, -1, 0)\,\mathbb{I}(LTV > 100)$$

- Use second noisy measure of house prices to construct $\widetilde{LTV}$
- Use $\mathbb{I}\left(\widetilde{LTV} > 100\right)$, $\mathbb{I}(t = -2, -1, 0)\,\mathbb{I}\left(\widetilde{LTV} > 100\right)$ as instruments
- Assumption: measurement errors in $\mathbb{I}(LTV > 100)$ uncorrelated
  - Example: Corelogic vs Zillow?

B. What *is* Strategic Default?

- ***Life event*** is anything which causes default when LTV ≤ 100
  - loan-modification program that incentivises default would be a "life event"
- ***Strategic default*** is a non-life event which causes default (when LTV > 100)
  - Relatively narrow definition compared to existing literature
- **Challenge:** no role for default decision to be based on *expected* LTV
  - May default on house **when in positive equity** if expect prices to fall
  - Expect negative equity by the time house could be sold
  - Default motivated by value of house, but classified as life event
  - $\Longrightarrow$ **underestimate** strategic default

C. Validity of Theoretical Assumptions

- **Assumption 2 (Conditional Exogeneity)**

$$\{Y(0,1), Y(1,0), Y(1,1)\} \perp T^* | G$$

- After conditioning on equity (G) no third factor that causes life event (T^*) and default decision (Y)
- Hard for this to fail given broad definition of life event
  - For above water, *anything* causing default is a life event

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  - For above water, *anything* causing default is a life event
- **Assumption 3 (Noisy Measure of Treatment)**

$$\{T(0), T(1)\} \perp (T^*, Y, G)$$

- Sensitivity of income (T) to life event unrelated to life event, default, home equity
- Broad definition of life event makes it easier for this assumption to fail

C. Validity of Theoretical Assumptions

Example: falling house prices leading to fall in income:

- Could cause above water borrowers to default $\Longrightarrow$ it's a life event
- However, the fall in house prices *also* makes negative equity more likely
- Those with **biggest income fall** more likely to have **negative equity**
  - $\Longrightarrow$ failure of Assumption 3 & underestimate strategic default

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  - $\implies$ failure of Assumption 3 & underestimate strategic default
- This is also mirrored in the regression

$$\frac{Income_t}{\bar{Income}_{pre}} = \lambda + \kappa \mathbb{I}(LTV > 100) + \gamma \mathbb{I}(t = -2, -1, 0) + \beta \mathbb{I}(t = -2, -1, 0)\, \mathbb{I}(LTV > 100) + \varepsilon$$

- Ratio of current to previous house prices $\frac{HP_t}{\bar{HP}_{pre}}$ will be:
  - Negatively correlated with $\mathbb{I}(t = -2, -1, 0)\, \mathbb{I}(LTV > 100)$
  - Positively correlated with $\frac{Income_t}{\bar{Income}_{pre}}$
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- **Further examples**: borrower characteristics, age, risk-aversion etc
- Straightforward to add controls but unclear how maps to theory

C. Validity of Theoretical Assumptions

Question: is there an extension of Proposition 1 where:

- Assumption 3 is weakened to hold conditional on further covariates X

$$\{T(0), T(1)\} \perp (T^*, Y, G) | X$$

- And share of underwater defaults caused by life events conditions on X?

$$\alpha \equiv \frac{\mathbb{E}(\mathrm{T}|\mathrm{Y}=1,\mathrm{G}=1,\mathrm{X}) - \mathbb{E}(\mathrm{T}|\mathrm{G}=1,\mathrm{X})}{\mathbb{E}(\mathrm{T}|\mathrm{Y}=1,\mathrm{G}=0,\mathrm{X}) - \mathbb{E}(\mathrm{T}|\mathrm{G}=1,\mathrm{X})}$$

- If so, X would then be added as controls in the regression
- Would strengthen the identification if it's possible
- Further evidence to support Assumption 3 if extension not possible

D. Additional Questions/Clarifications

- Share of strategic default also estimated using quantile regression
  - Analogous version of Proposition 1 for conditional quantiles $Q_q(Y|G=1)$?
- Clarification on LTV robustness exercises
  - Is the 60% alternative LTV cut-off comparing LTV above/below 60?
  - Or LTV below 60 with LTV above 100?
- How are the standard errors in the baseline regression treated?
- More details on mortgages in dataset e.g. term, whether ARM vs FRM, when originated, geographical spread

Summary

- Great paper tackling important question
- Novel data and method to produce sharp empirical estimates
- Suggest further work to ensure not underestimating strategic default

References

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