# Regulating Zombie Mortgages

Jonathan Lee[1] Duc Duy Nguyen[2] Huyen Nguyen[3]

[1]University of Glasgow [2]Durham University [3]Halle Institute for Economic Research (IWH)

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# Introduction

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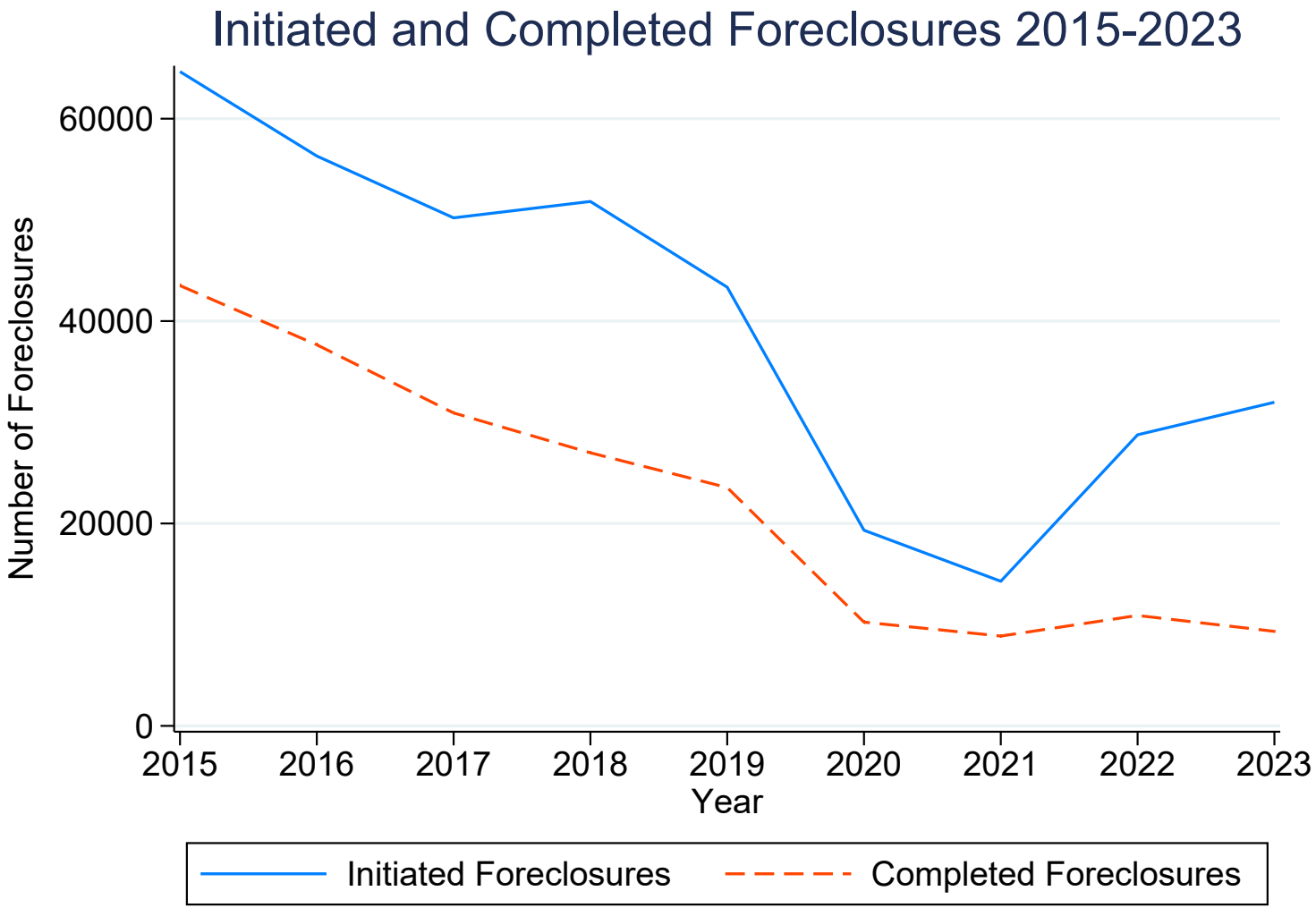
- Zombie properties create negative externalities: pose environmental and health risks, attract crime and vandalism, reduce house values, and cost public funds for cleanup.
- Important and timely issue: #zombie properties sharply increases since 2021. 8 million in US in 2023 and costs $50bn for cleanup.
- This is also a worldwide issue.

# Foreclosure Trends



# The haunted house

# The debate on zombie properties law

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One solution is to implement Zombie Property Laws (ZL) to hold lenders accountable for maintaining vacant properties in foreclosure.
However, there is a debate on the efficacy of the law:

- ZL tackles the issue of zombie properties. ZL also increases lenders' skin in the game & improve lending standards.
- However, ZL could impose excessive maintenance and litigation costs on lenders $\rightarrow$ adversely affect the availability and cost of credit.
- Also, ZL could motivate lenders to continue lending to distressed borrowers to avoid maintenance responsibilities $\rightarrow$ exacerbate the negative impact of foreclosure.

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- The law requires lenders to inspect residential properties within 90 days after a mortgage loan falls into delinquency.
- If the property is vacant and abandoned, lenders must assume maintenance obligations for the property. Failing to do so, lenders or mortgage servicers may face financial fines or being sued by cities.

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  3. continuing to lend to distressed borrowers to avoid maintenance responsibilities of the house.

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- We shed light on factors affecting lenders' decision to modify delinquent mortgages. We show that foreclosure litigation costs can be a motive for lenders to keep delinquent mortgages alive.

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- Loan-level mortgage data from **Home Mortgage Disclosure Act** from 2012 to 2018.
  - The data include borrower demographics (gender, race, and income), loan characteristics (e.g., loan amount), the decision on the application (approved, denied, or withdrawn), the location of the property, & the lender's identity.
  - Exclude refinancing and home improvement loans, and focus on single-family residential mortgages.
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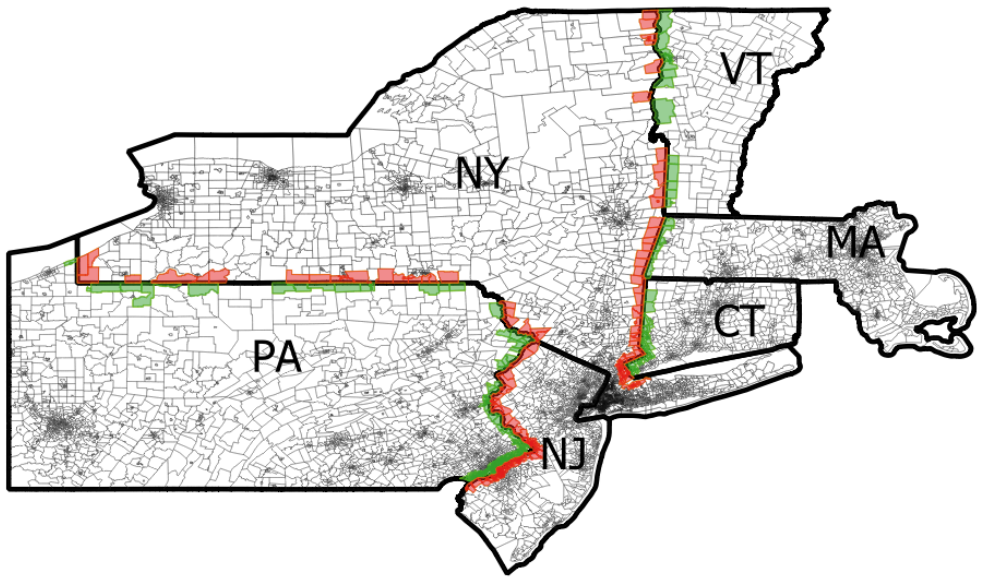
# Research design

We use a diff-in-diffs estimation combined with a spatial RDD design. We restrict our sample to areas that are 5 miles from either side of the state borders between states with and without the ZL.
Treated states=NY, NJ. Control states = PA, VT, CT, MA



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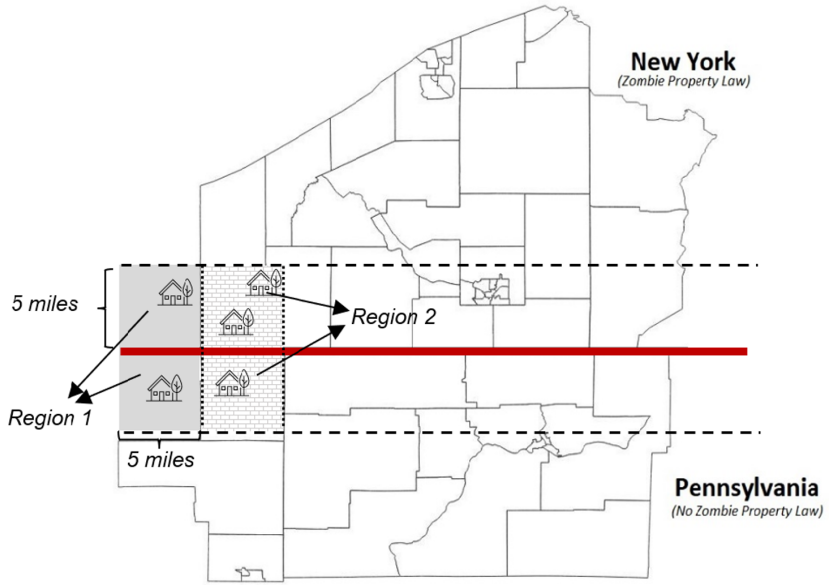
- The dependent variables $y_{ilrst}$ are acceptance/spread/modification




$\beta$ captures differences in loan outcomes in treated areas relative to control states within the same region after ZL is enacted.

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# Parallel trend assumption

| | Non-ZL states | | ZL states | | |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | ND |
| Sample: HMDA data | | | | | |
| Accept | 0.772 | 0.419 | 0.763 | 0.425 | 0.01 |
| Loan Amount | 12.241 | 0.942 | 12.141 | 0.974 | 0.07 |
| Applicant Income | 11.628 | 0.823 | 11.475 | 0.875 | 0.13 |
| LTV | 2.176 | 1.132 | 2.371 | 1.348 | -0.11 |
| Male | 0.653 | 0.476 | 0.625 | 0.484 | 0.04 |
| Minority | 0.212 | 0.409 | 0.286 | 0.452 | -0.12 |
| Coapplicant | 0.491 | 0.500 | 0.441 | 0.497 | 0.07 |
| Jumbo | 0.199 | 0.400 | 0.148 | 0.355 | 0.10 |
| Observation | 64,548 | | 35,705 | | |

- We report statistics of covariates over the pre-shock period (2012-13) dividing the sample between treated and control loans.
- No significant difference between treated and control loans.

# Parallel trend assumpption (cont.)

| | Non-ZL states | | ZL states | | |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | ND |
| Sample: McDash | | | | | |
| Spread | 0.809 | 0.407 | 0.833 | 0.413 | 0.04 |
| FICO | 714.689 | 56.751 | 713.588 | 55.216 | -0.01 |
| LTV | 88.606 | 13.820 | 88.492 | 13.424 | -0.01 |
| Low Documentation | 0.012 | 0.111 | 0.018 | 0.132 | 0.03 |
| Prepayment penalty | 0.008 | 0.092 | 0.014 | 0.116 | 0.04 |
| Seriously delinquency | 0.049 | 0.216 | 0.047 | 0.211 | 0.01 |
| Observation | 6,038 | | 11,284 | | |
| Sample: Bank level data | | | | | |
| Total asset (ln) | 18.076 | 2.934 | 18.555 | 2.860 | 0.12 |
| Equity-to-assets ratio (%) | 11.266 | 2.198 | 10.933 | 1.957 | -0.11 |
| ROA(%) | 0.823 | 0.547 | 0.891 | 0.467 | 0.10 |
| Deposit-to-assets ratio(%) | 72.872 | 10.309 | 71.753 | 12.608 | -0.07 |
| Loan-to-assets ratio(%) | 59.338 | 14.440 | 55.911 | 14.677 | -0.17 |
| Observation | 734 | | 644 | | |

- Riskiness of treated and control loans follows similar trends before ZL.
- No significant difference between banks operating in ZL and non ZL states

# Manipulation of treatment status

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Dependent variable | Number of applications | | Total Loan Amount | |
| Zombie Law | 0.122 | 0.087 | 0.171 | 0.083 |
| | (0.124) | (0.069) | (0.298) | (0.110) |
| Applicant Income | | 0.401*** | | 0.984*** |
| | | (0.041) | | (0.055) |
| Male | | -0.074*** | | -0.119*** |
| | | (0.023) | | (0.031) |
| Minority | | -0.331*** | | -0.564*** |
| | | (0.032) | | (0.050) |
| Coapplicant | | 0.054* | | 0.082* |
| | | (0.031) | | (0.049) |
| Jumbo | | 0.065 | | 0.472*** |
| | | (0.056) | | (0.080) |
| Observations | 6,263 | 6,263 | 6,263 | 6,263 |
| Adjusted $R^2$ | 0.002 | 0.219 | 0.001 | 0.445 |

Neither does ZL affect the **number** of applications nor it affects the **amount** of the mortgages received in treated states.

# Main results: Acceptance and Interest Rates

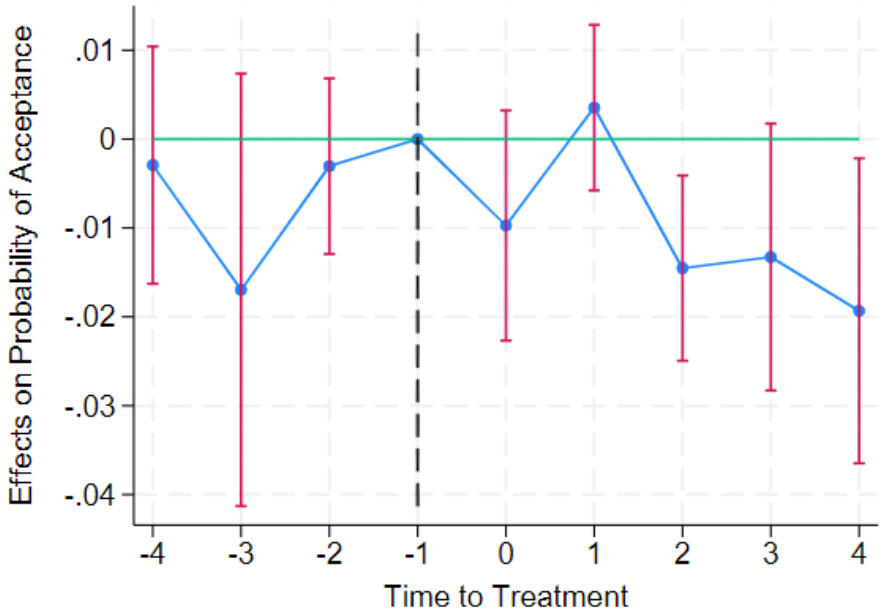
| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Dependent variable | Acceptance | | | Spreads | |
| Zombie Law | -0.015** | -0.012** | -0.016*** | 0.087*** | 0.045*** |
| | (0.006) | (0.005) | (0.005) | (0.014) | (0.008) |
| Observations | 199,076 | 199,076 | 199,076 | 28,829 | 28,829 |
| Control Variables | No | Yes | Yes | No | Yes |
| Region-Year FE | Yes | Yes | Yes | Yes | Yes |
| Bank FE | Yes | Yes | No | No | No |
| Bank-Year FE | No | No | Yes | No | No |
| Adjusted $R^2$ | 0.174 | 0.195 | 0.199 | 0.381 | 0.408 |
| Data | HMDA | HMDA | HMDA | McDash | McDash |

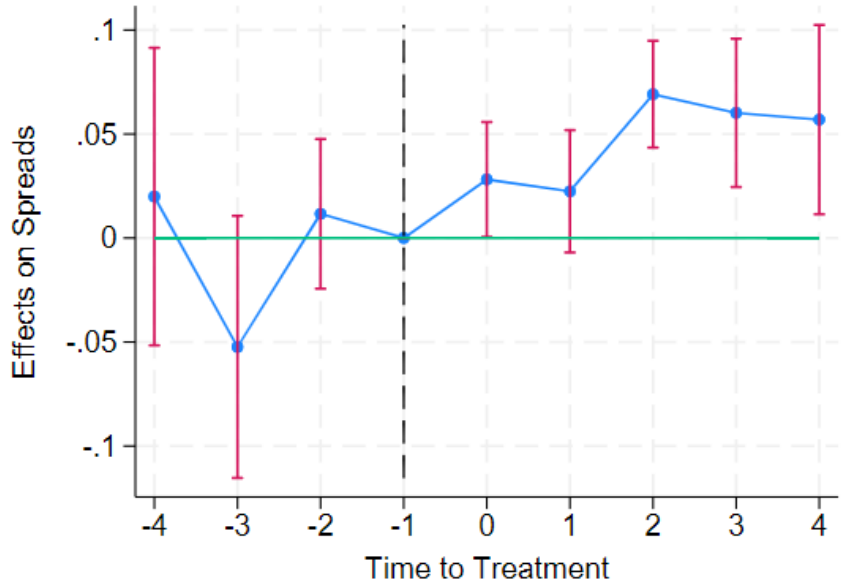
Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Column 3: After ZL laws, lenders are 1.6 p.p. more likely to reject applications in treated states relative to counterfactual (2% compared to the mean).
- Column 5: After ZL laws, interest rate spread is 4.5 basis points higher for borrowers in treated states relative to counterfactual (5% compared to the mean).

# Dynamic Effects of ZL on Acceptance and Interest Rates




The figure shows dynamic treatment effects using the Sun and Abbraham (2021) approach. Before the enactment of ZL, acceptance and spreads

# Interpreting econ magnitude of the increase in rate spread

To what extent the increase in interest rates offsets the potential costs that lenders may incur upon foreclosure?

- Costs: Lenders incur \$5,277 to maintain each foreclosed property.
  - Estimated by on avg spending on house maintenance of NJ/NY households in 2013.

- Benefits: Interest rate increases by 4.5 bp $\rightarrow$ \$4,284 to maintain each foreclosed property.
  - Estimated by on avg LTV, default rate, and time to default.

$\longrightarrow$ The increase in interest rates fairly compensates lenders for the costs of ZL.

# Low risk vs high risk loans

| Dependent variables | (1) Accept | (2) Accept | (3) Loan Spread | (4) Loan Spread |
|---|---|---|---|---|
| Zombie Law | -0.003 | -0.014*** | 0.035*** | 0.068*** |
| | (0.006) | (0.005) | (0.011) | (0.010) |
| Zombie Law × High LTI | -0.025** | | | |
| | (0.011) | | | |
| Zombie Law × High Income | | 0.007* | | |
| | | (0.004) | | |
| Zombie Law × High LTV | | | 0.032*** | |
| | | | (0.010) | |
| Zombie Law × High FICO | | | | -0.096*** |
| | | | | (0.012) |

- The effects are more salient among **riskier** borrowers: lower income, lower FICO score, and higher LTI and LTV ratios. $\longrightarrow$ lenders screen applications more carefully after ZL.

# Lenders' skin in the game

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Dependent variable | Accept | | | | |
| Sample | Full | | | NJ pairs | NY pairs |
| Zombie Law | -0.052*** | -0.009 | -0.008 | 0.008 | -0.029 |
| | (0.014) | (0.014) | (0.015) | (0.018) | (0.028) |
| Zombie Law × High lender assets | 0.049** | | | | |
| | (0.023) | | | | |
| Zombie Law × High loan-to-assets ratio | | -0.074*** | | | |
| | | (0.027) | | | |
| Zombie Law × High equity-to-assets ratio | | | -0.033** | | |
| | | | (0.015) | | |
| Zombie Law × Out of state banks | | | | -0.033* | 0.039 |
| | | | | (0.017) | (0.028) |

- The effects are stronger for smaller and safer lenders and those focus on lending $\longrightarrow$ these lenders are more exposed to ZL

# Loan modification and Loan Cure Rates

| | 1 | 2 | 3 |
|---|---|---|---|
| Dependent variables | Renegotiated (6 months) | Cured (6 months) | Cured (12 months) |
| Zombie Law | 0.081** | -0.013 | -0.004 |
| | (0.037) | (0.037) | (0.039) |
| Renegotiated | | 0.365*** | 0.203*** |
| | | (0.074) | (0.036) |
| Zombie Law x Renegotiated | | 0.078 | 0.045 |
| | | (0.084) | (0.054) |

- After ZL laws, lenders are 8.1% more likely to allow distressed borrowers to modify the term of mortgage (such as by reducing interest rates).
- Are the revived borrowers 'cured'? **No–They are not.** Delinquent borrowers that are 'revived' following the enactment of ZL laws are not more likely to escape delinquency.

# Other tests

- Placebo tests that alternate the timing/location of the law.
- Alternative S.E. clustering
- Robust to controlling for other state laws and location characteristics.
- Alternative thresholds, e.g., 2.5km or 10km.

# Conclusion

- We study the effect of zombie property law on mortgage lending behavior.
- We find that lenders reduce credit supply and increase interest rates, consistent with banks passing the costs to borrowers.
- Lenders are also more likely to revive the mortgages for seriously delinquent borrowers so that lenders do not have to assume maintenance responsibility of the house.
- Our results inform regulators on unintended effect of the zombie property law.

*Thank you.*