

# Are Mortgage Regulations Affecting Entrepreneurship?

**Stephanie Johnson**

Northwestern University

May 2018

# Are mortgage regulations reducing entrepreneurship?

- Residential mortgage credit important for early stage businesses.
- Business owners particularly affected by rules targeting *high debt-to-income* mortgages because of additional documentation needed to count business income.

# Approach

- Some banks are subject to a recent U.S. rule restricting debt-to-income (Ability-to-Repay rule).
- I calculate measures of local exposure to the affected banks and take a difference-in-differences approach.

# Preview

- How do debt-to-income restrictions affect self-employed credit access?

Reduces mortgage lending in high self-employment areas  
(Self-employed are *disproportionately* affected)

- Does this have broader effects on entrepreneurship?

Reduces self-employment and new small business employment

# Preview

- How do debt-to-income restrictions affect self-employed credit access?

Reduces mortgage lending in high self-employment areas  
(Self-employed are *disproportionately* affected)

- Does this have broader effects on entrepreneurship?

Reduces self-employment and new small business employment

# Preview

- How do debt-to-income restrictions affect self-employed credit access?

Reduces mortgage lending in high self-employment areas  
(Self-employed are *disproportionately* affected)

- Does this have broader effects on entrepreneurship?

Reduces self-employment and new small business employment

# Preview

- How do debt-to-income restrictions affect self-employed credit access?

Reduces mortgage lending in high self-employment areas  
(Self-employed are *disproportionately* affected)

- Does this have broader effects on entrepreneurship?

Reduces self-employment and new small business employment

## Institutional Background and Empirical Approach



# Ability-to-Repay

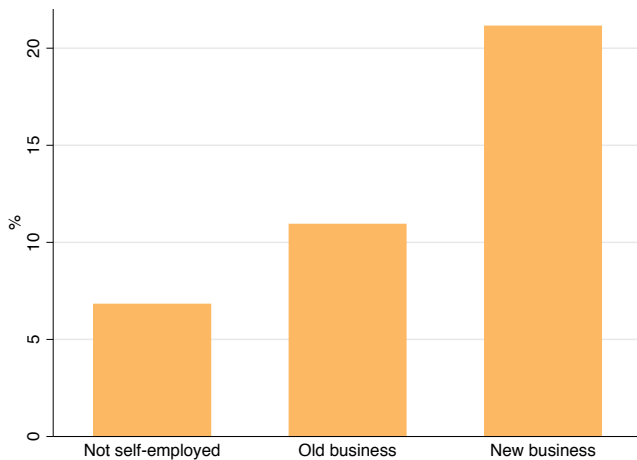
Ability-to-Repay (ATR) rule implemented in US in 2014:

- **Verification:** Requires banks to rigorously assess whether repayments are affordable given *verified* income.
- **Payment restriction for Qualified Mortgages:** less than 43% of verified income (with some exceptions).

## Why is ATR a problem for the self-employed?

- To count business income need two years of verified accounts.
- Focus is on the lower bound of recent income history.
- Tax ‘optimization’ → verifiable income may be lower.
- Less likely to qualify for classes of loans exempt from the rules (conforming, FHA).

## Share of households with DTI above limit



Survey of Consumer Finances 2010; 2013

## Exemptions from 43% DTI requirement

- Conforming loans.
- Government-insured loans.
- **Loans originated and held in portfolio by small lenders.**

# Approach

Lenders exempt if sufficiently small (assets < \$2b, loans < 500):

- Compare exempt bank lending with similar non-exempt banks.
- Calculate measures of local exposure to affected banks and relate to:
  - Mortgage credit
  - Self-employment
  - New small business employment.

# Data

- HMDA – Loan-level data covering most U.S. residential mortgages.
- ACS – Census tract self-employment share.
- FDIC – Branch deposits and locations.
- BEA – Non-farm proprietors' employment.
- LODES – Census tract employment.
- CE/SCF – DTI by household type.

*Ability-to-Repay Rule Reduces Mortgage Credit*

## Credit results

- Debt-to-income ratios fall for self-employed relative to other households [*particularly if no salary income*]
- Relative decline in mortgage originations in high self-employment census tracts [*particularly in counties without exempt banks*]
- Exempt banks gain market share in high self-employment census tracts [*only for portfolio loans*]



## Self-employed debt-to-income ratios decline

| <i>Explanatory Variables</i> | Debt to Income Ratio (%) |        |                          |        |
|------------------------------|--------------------------|--------|--------------------------|--------|
|                              | All self-employed        |        | Self-employed w/o salary |        |
|                              | Coef.                    | SE     | Coef.                    | SE     |
| <i>Includes DTI = 0</i>      |                          |        |                          |        |
| Post $\times$ Self-employed  | -2.09***                 | (0.64) | -3.57***                 | (1.19) |
| Number of Observations       | 108,951                  |        | 102,422                  |        |
| State $\times$ Post          | X                        |        | X                        |        |
| Controls $\times$ Post       | X                        |        | X                        |        |

$$\begin{aligned}
 DTI_{i,t} = & \alpha_{0,s} + \alpha_{1,s} \cdot \mathbb{1}[t \geq 2014] + \beta_0 \text{Self Emp.}_i + \beta_1 \text{Self Emp.}_{i,t} \cdot \mathbb{1}[t \geq 2014] \\
 & + \beta_2 X_{i,t} + \beta_3 \cdot X_{i,t} \mathbb{1}[t \geq 2014] + \epsilon_{i,t}
 \end{aligned}$$

## Are locations with high self-employment more affected?

And does the presence of exempt bank branches matter?

$$\begin{aligned}\log(\text{Loans})_{c,t} &= \gamma_c + \alpha_s \cdot \mathbb{1}[t \geq 2014] \\ &+ \beta_1 \mathbb{1}[\text{Self Emp.}_{c,2005-2013} > 15\%] \cdot \mathbb{1}[t \geq 2014] \\ &+ \beta_2 \text{Affected}_{n,2014} \cdot \mathbb{1}[\text{Self Emp.}_{c,2005-2013} > 15\%] \cdot \mathbb{1}[t \geq 2014] \\ &+ \beta_3 \text{Affected}_{n,2014} \cdot \mathbb{1}[t \geq 2014] \\ &+ \beta_4 X_c \cdot \mathbb{1}[t \geq 2014] + \epsilon_{c,t}\end{aligned}$$

## Are locations with high self-employment more affected?

| <i>Explanatory Variables</i>                   | $100 \times \log(\text{Number of Loans})$ |        |          |        |
|--|---|--------|----------|--------|
|  | Coef.                                     | SE     | Coef.    | SE     |
| Post $\times$ High Self-emp.                   | -2.90***                                  | (0.33) | -0.25    | (1.31) |
| Post $\times$ Affected                         |   |        | 1.79     | (1.96) |
| Post $\times$ Affected $\times$ High Self-emp. |   |        | -4.99*** | (1.86) |
| Number of Tracts                               | 54,101                                    |        | 5,222    |        |
| Number of Counties                             | 1,801                                     |        | 525      |        |
| Number of States                               | 51  |        | 46       |        |
| Number of Observations                         | 215,931                                   |        | 20,840   |        |
| County $\times$ Post FE                        | X   |        |          |        |
| State $\times$ Post FE                         |   |        | X        |        |
| Tract FE                                       | X   |        | X        |        |
| Tract controls $\times$ Post                   | X   |        | X        |        |

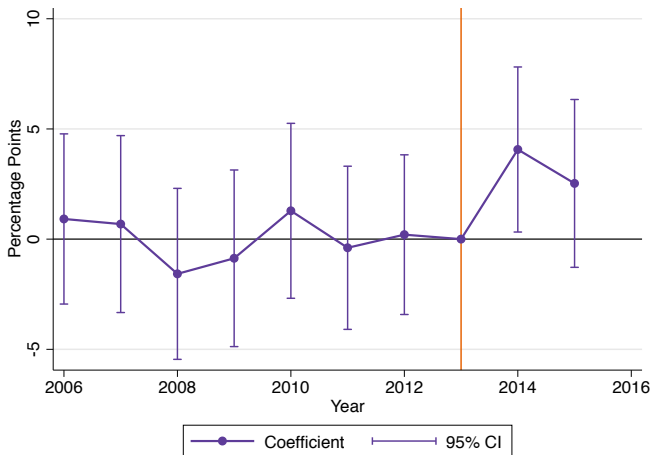
## Market share of exempt banks

Does market share of exempt banks increase by more in high self-employment tracts?

| <i>Explanatory Variables</i> | Market Share of Exempt Banks |        |         |        |
|------------------------------|------------------------------|--------|---------|--------|
|                              | Coef.                        | SE     | Coef.   | SE     |
| Post                         | 5.98                         | (9.19) | -0.77   | (9.28) |
| Post × High Self-emp.        | 4.27**                       | (1.68) |         |        |
| Post × Self-emp.             |                              |        | 0.62*** | (0.22) |
| Number of Tracts             | 841                          |        | 841     |        |
| Number of Counties           | 180                          |        | 180     |        |
| Number of States             | 29                           |        | 29      |        |
| Number of Observations       | 2,189                        |        | 2,189   |        |
| Tract FE                     | X                            |        | X       |        |
| Tract controls × Post        | X                            |        | X       |        |

$$M_{\text{Exempt},c,t} = \gamma_c + \alpha \mathbb{1}[t \geq 2014] \\ + \beta_1 \mathbb{1}[\text{Self Emp.}_{c,2005-2013} > 15\%] \cdot \mathbb{1}[t \geq 2014] + \dots$$

# Market share of exempt banks



$$M_{\text{Exempt},c,t} = \gamma_c + \alpha_t + \beta_{1,t} \mathbb{1}[\text{Self Emp.}_{c,2005-2013} > 15\%] + \dots$$

*Ability-to-Repay Rule Reduces Entrepreneurship*

# Entrepreneurship results

- Policy reduces self-employment
- Policy reduces small business employment [*Only for new businesses*]

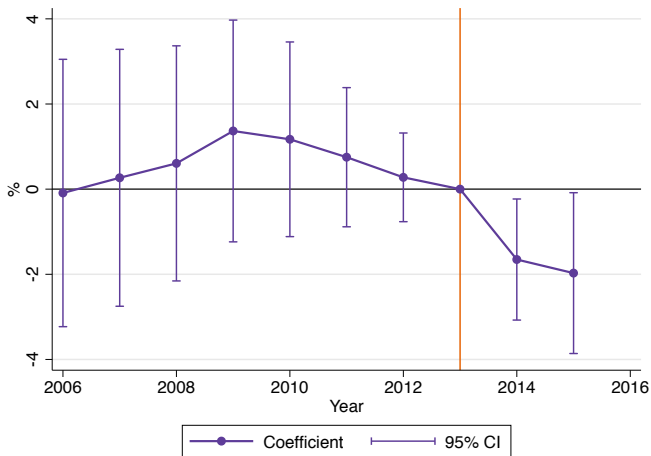
## Does the policy reduce self-employment?

| <i>Explanatory Variables</i>       | 100 × log(Self Employment Share) |        |         |        |
|------------------------------------|----------------------------------|--------|---------|--------|
|                                    | Coef.                            | SE     | Coef.   | SE     |
| Post × Affected Bank Share         | -1.46***                         | (0.56) | -1.95** | (0.76) |
| Post × Rural County                | 0.33                             | (0.37) |         |        |
| Post × Rural × Affected Bank Share | 0.43                             | (0.53) |         |        |
| Number of Counties                 | 2,796                            |        | 1,719   |        |
| Number of States                   | 50                               |        | 50      |        |
| Number of Observations             | 11,183                           |        | 6,876   |        |
| State × Post FE                    | X                                |        | X       |        |
| County FE                          | X                                |        | X       |        |
| County controls × Post             | X                                |        | X       |        |

$$\begin{aligned}\log(\text{Self Emp.}_{n,t}) &= \gamma_n + \alpha_s \mathbb{1}[t \geq 2014] \\ &+ \beta_1 \text{Affected Share}_{n,2014} \mathbb{1}[t \geq 2014] \\ &+ \beta_2 X_n \mathbb{1}[t \geq 2014] + \epsilon_{n,t}\end{aligned}$$



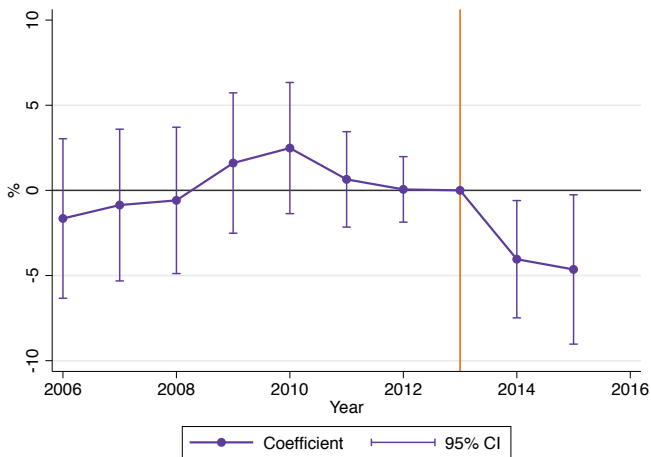
## Does the policy reduce self-employment?



$$\log(\text{Self Emp.}_{n,t}) = \gamma_n + \alpha_{s,t} + \beta_{1,t} \text{Affected Share}_{n,2014} + \beta_{2,t} X_n + \epsilon_{n,t}$$

# Does the policy reduce self-employment?

**Only counties with** Affected Share<sub>n</sub> ≤ 0.75



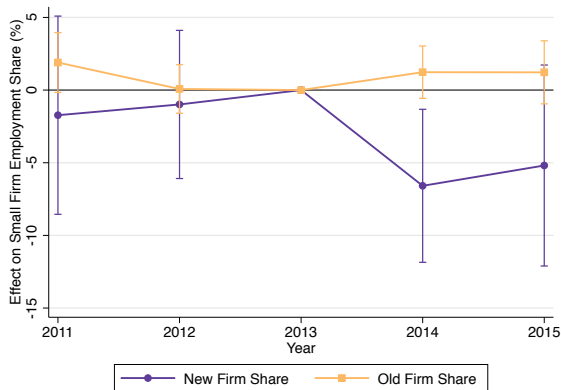
$$\log(\text{Self Emp.}_{n,t}) = \gamma_n + \alpha_{s,t} + \beta_{1,t} \text{Affected Share}_{n,2014} + \beta_{2,t} X_n + \epsilon_{n,t}$$

## Does the policy reduce small firm employment?

| <i>Explanatory Variables</i>  | $\log\left(\frac{x}{\text{Total Emp.}}\right)$ |        |           |        |
|-------------------------------|--|--------|-----------|--------|
|                               | New Small                                      |        | Old Small |        |
|                               | Coef.  | SE     | Coef.     | SE     |
| Post $\times$ Branch Affected | -4.78**  | (2.37) | 1.15      | (0.93) |
| Number of Tracts              | 21,009   |        | 30,374    |        |
| Number of Counties            | 847  |        | 971       |        |
| Number of States              | 49   |        | 49        |        |
| Number of Observations        | 65,006   |        | 118,712   |        |
| County $\times$ Post FE       | X  |        | X         |        |
| Tract FE                      | X  |        | X         |        |

$$\log\left(\frac{\text{New Small Firm Emp.}_{c,t}}{\text{Total Emp.}_{c,t}}\right) = \alpha_c + \gamma_n \mathbb{1}[t \geq 2014] \\ + \beta_1 \mathbb{1}[\text{Branch Affected}]_{c,2014} \mathbb{1}[t \geq 2014] \\ + \beta_2 X_c \mathbb{1}[t \geq 2014] + \epsilon_{c,t}$$

# Does the policy reduce small firm employment?



Excludes census tract years with zero new small firm employment

$$\log\left(\frac{\text{New Small Firm Emp.}_{c,t}}{\text{Total Emp.}_{c,t}}\right) = \alpha_c + \gamma_{n,t} + \beta_{1,t} \mathbb{1}[\text{Branch Affected}]_{c,2014} + \beta_{2,t} X_c + \epsilon_{c,t}$$

# Conclusion

- Verified debt-to-income requirements reduce entrepreneurship.
- Exemptions for small banks mitigate these effects. Would other exemptions also be helpful? (*Ambrose, Conklin & Yoshida, 2016*).
- Need to think about goals of household leverage regulation: protect consumers; control house prices/aggregate leverage. (*DeFusco, Johnson & Mondragon, 2018; Johnson, 2018*)