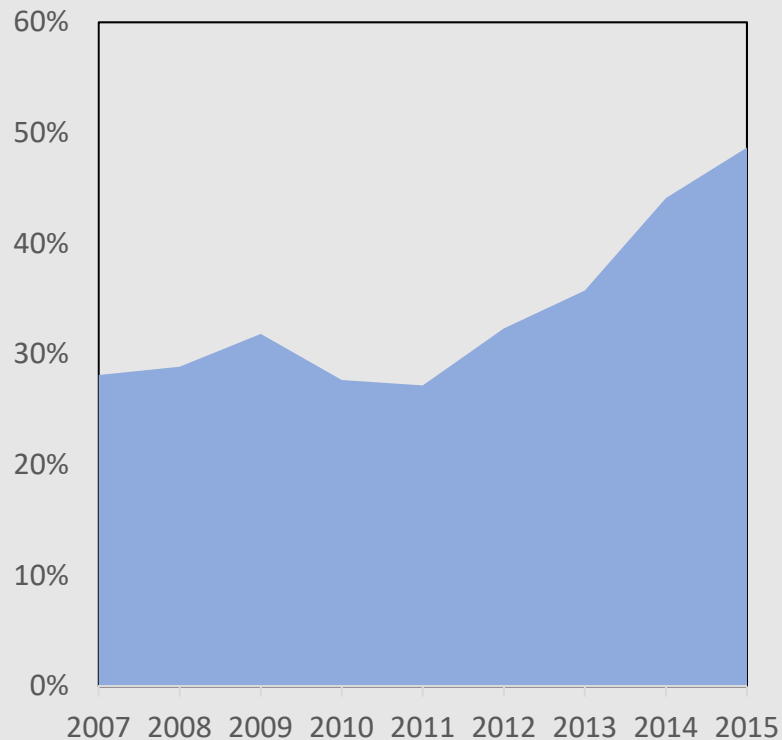

Fintech, Regulatory Arbitrage, and the Rise of Shadow Banks

Greg Buchak, University of Chicago
Gregor Matvos, Chicago Booth and NBER
Tomek Piskorski, Columbia GSB and NBER
Amit Seru, Stanford University and NBER

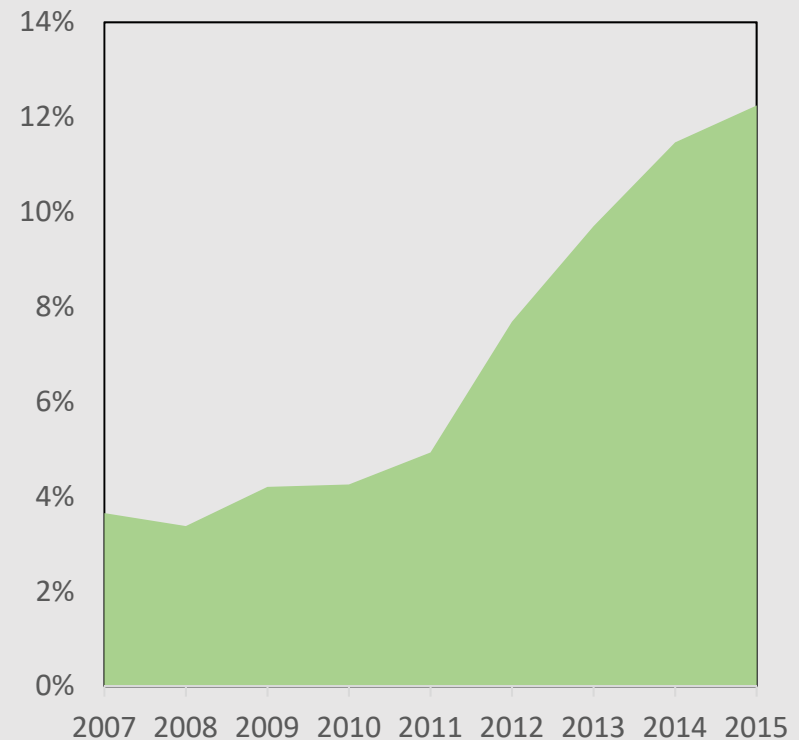
Two Trends in Residential Mortgages

Assess role of technology and regulation in recent increase of market disruptors: Focus on largest consumer finance market

1. Growth of shadow bank origination share



2. Growth of fintech origination share



Two Trends in Residential Mortgages

1. Growth of shadow bank origination share

- Immediately post-crisis, largest shadow banks exit.
- In years following crisis, shadow bank share grows again

2. Growth of fintech origination share

- Rapid expansion along with tech sector more broadly
 - Quicken Loans now 3rd largest mortgage originator
-

Two Trends, Two forces

Two economic forces possibly at work:

1. Regulation

- New regulations in wake of financial crisis.
- Many regulations specifically target **banks**.
- **Shadow banks** largely exempt

2. Technology

- Broad moves towards online transactions.
- Broad moves towards use of “big data,” advanced models.

Our objective:

How much of shadow bank and fintech growth is **regulation**, how much is better **technology**?

Possible Mechanisms

1. **Regulation:** Shadow banks fill regulatory gaps.

- Traditional banks face rising capital costs.
- Traditional banks face greater capital constraints.
- Traditional banks face greater regulatory scrutiny.

2. **Technology:** Fintech possesses better technology.

- Fintech lends at lower cost.
 - Fintech offers higher quality products.
 - Fintech uses big data and better models to screen better.
-

Basic Approach

1. Effects of Regulation

- Compare banks to shadow banks.
- Look for differences associated with regulations.

2. Role of Technology

- *Within* shadow banks, compare fintech and non-fintech.
- Holding regulation constant, look for differences across types.

3. Disentangling the Effects

- Structural model of lender choice and entry.
 - Contribution of regulation and technology to big-picture market trends.
-

Road Map

- 1. Data and definitions**
 - 2. Facts on shadow banking and fintech loans**
 - 3. Effect of regulation**
 - 4. Effect of technology**
 - 5. Model**
-

Data and Definitions

Definitions

1. Shadow Bank

- Non-depository institution
- Many banking regulations apply only to depository institutions
- Example: **American Pacific Mortgage**

2. Fintech

- **Subset** of shadow bank originators
 - Origination, approval, rate decision, occurs online
 - Example: **Quicken Loans**
-

A “Non-Fintech” Shadow Bank

[Home](#) / [Home Refinance](#) / [Refinance Process](#) / [Getting Approved For A Refinance](#)

What to expect.

Understand the refinance process from application through closing.

Here is a quick overview of the approval process. [A Home Loan Specialist](#) can answer any questions you may have.

Initial review

You are assigned a loan processor who works with you through your closing – organizing your paperwork and making sure [your documentation](#) is complete prior to the final review.

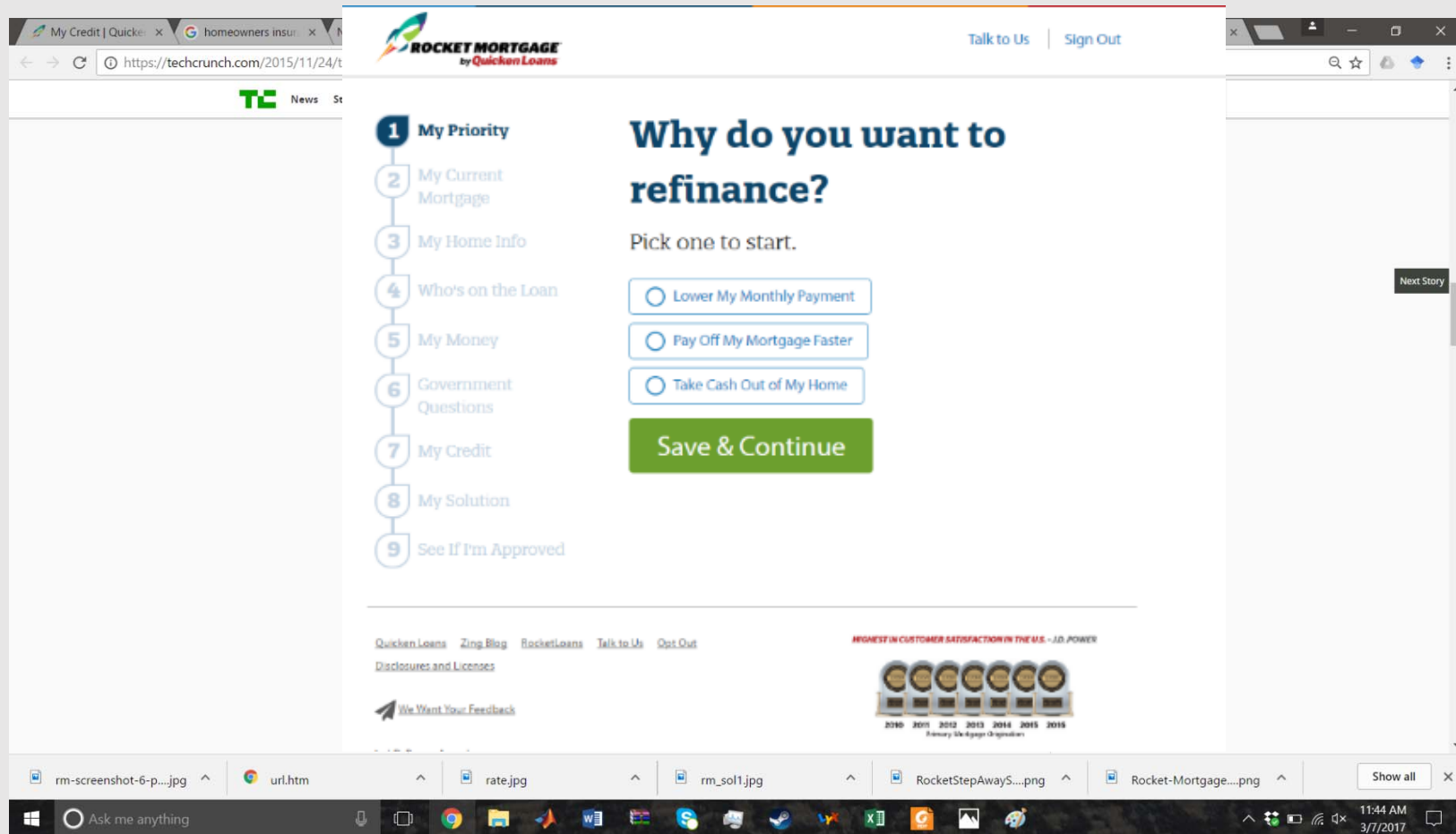
Underwriting

Once we have your documentation, [an underwriter reviews your loan package](#) to make sure it fits loan guidelines, evaluates your loan application, and then makes a credit decision. In some cases, we may request additional information before making a decision. Your loan processor can assist you with this.

Approval decision

Once your loan is approved, a closing date will be set. At least three business days before your closing date, we will

A “Fintech” Shadow Bank



Data

1. HMDA

- All loans (can analyze entry)
- Originator name, borrower demographics
- **No** loan outcomes

2. Fannie Mae and Freddie Mac

- Conforming loans purchased by Fannie Mae or Freddie Mac
- Originatory name, FICO, interest rates, location, purpose
- **Includes** loan outcomes

3. Regulatory Data

- Lawsuit settlements arising out of Financial Crisis (Law360, SEC, SNL Financial)
- Bank capital ratios, mortgage assets (Federal Reserve)

4. Census

- County-level demographic information
-

Basic Facts

Basic Facts

- 1. Loan types, purposes, and financing**
 - 2. Borrower characteristics**
 - 3. Pricing and performance**
-

Loan Types, Purpose and Buyers

1. Loan Types

- Shadow banks originate roughly 75% of FHA loans
- FHA loan segment: Particularly high risk

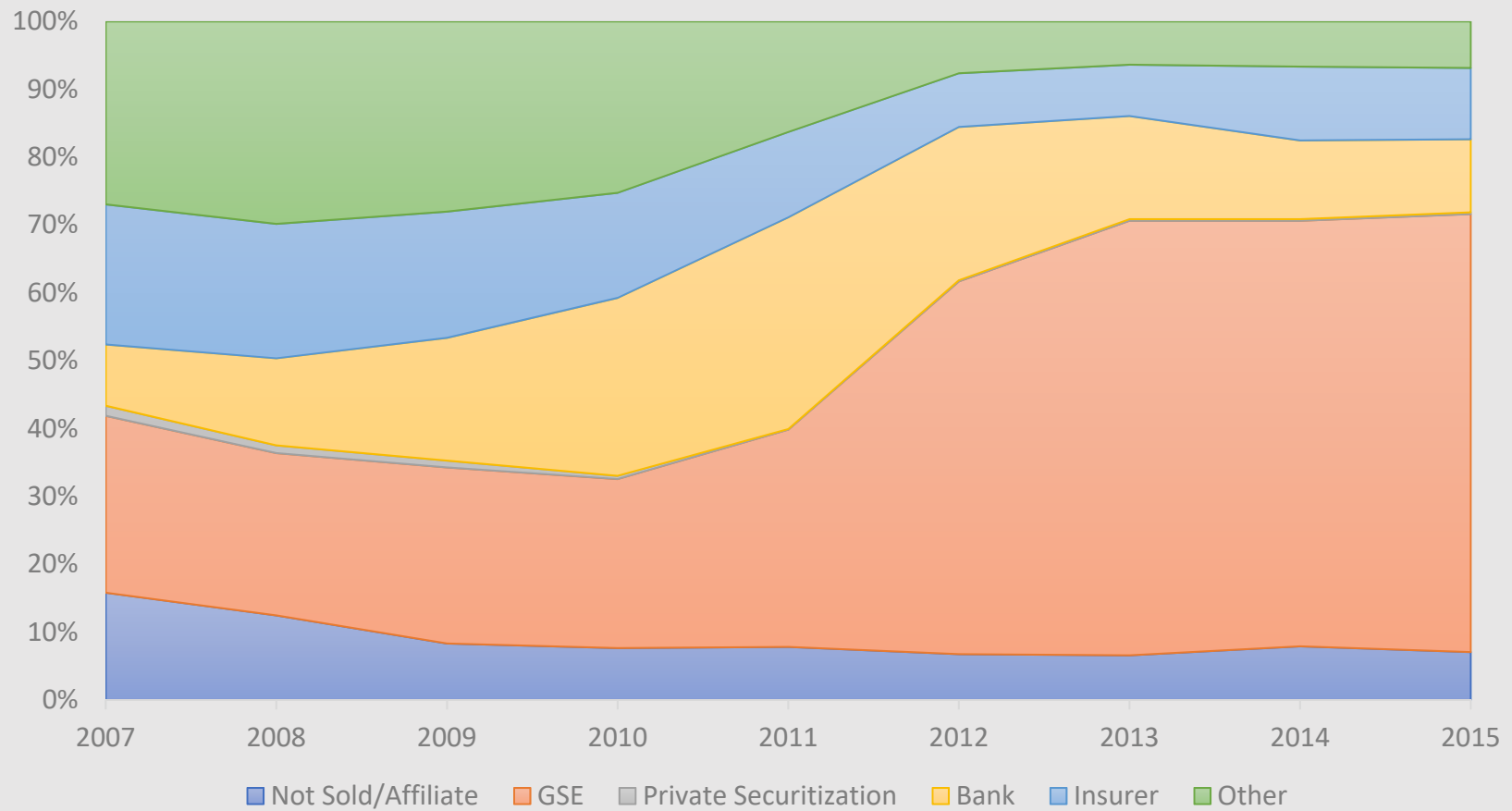
2. Loan Purpose

- 75% of fintech loans are refinances vs. 50% for others
- Likely possess comparative advantage in refinance

3. Loan Buyers

- Banks more likely to retain mortgages on balance sheet
 - Shadow banks sell to GSEs or private buyers and do so at a faster pace
-

Loan Financing



Borrower Characteristics

1. Race/Ethnicity

- Shadow banks generally more active among minorities
- Fintech shadow banks more active among non-minorities

2. FICO Scores

- Both fintech and non-fintech active among lower FICO borrowers

3. Economic Situations

- Shadow banks generally more active in high-unemployment areas
 - Fintech shadow banks more active in low-unemployment areas
 - Shadow banks borrowers less-likely to be first-time borrowers
-

Interest Rates and Performance

1. Interest Rates

- Non-fintech shadow banks 3-5 bps **cheaper** than banks
- Fintech shadow banks 10-12 bps **more expensive** than banks

2. Performance

- Shadow banks loans 0.02%-0.04% more likely to default
 - Shadow bank loans 2%-3% more likely to prepay
-

Basic Facts Summary

1. Loan Types, Purposes, and Financing

- Shadow banks specialize in high risk FHA sector
- Fintech specifically specializes in refinances
- Shadow banks rely on external financing

2. Borrower Characteristics

- Shadow banks target higher risk borrowers

3. Pricing and Performance

- Fintech charges significant premium, suggests higher quality or convenience value
 - Shadow banks perform slightly worse
-

Role of Regulation

Regulatory Constraints and Rise of Shadow Banks

1. What we know so far:

- Shadow banks target riskier market segments
- Shadow banks reliant on external finance
- Traditional banks often hold loans on balance sheet
- Traditional banks tend to hold loans for longer even if they sell

2. This section:

- Spatial evidence on shadow bank entry and regulation
 - Exploit three sources of regulatory variation
-

Spatial Tests to Estimate Patterns

1. Growth in capital ratios

- **Hypothesis:** Banks re-growing capital forego lending, shadow banks enter.

2. Changing treatment of mortgage servicing rights

- **Hypothesis:** New regulation disadvantages MSR as a component of capital. Banks with high MSR% of Tier-1 Capital reduce lending, shadow banks enter.

3. Lawsuits arising out of financial crisis

- **Hypothesis:** Post-crisis lawsuits fell on banks, shadow banks enter.
-

Regulation: Using Lawsuit Exposure

	(1)	(2)
	Δ SB Share	Δ SB Share
Lawsuits	0.351*** (0.049)	0.124* (0.056)
Big Bank Share	- -	21.2*** (2.55)
Other Controls	Y	Y
<i>N</i>	3117	3117
<i>R</i> ²	0.067	0.087

- Economically significant association:
 - County with mean traditional bank lawsuit exposure relative to a county with no exposure sees 6.5% percentage point increase in shadow bank market share ($\$18.6 \times 0.35$).

Role of Technology

Technology and Rise of Fintech

1. What we know so far:

- Fintech charges significant premium versus non-fintech
- Suggests fintech provides quality rather than cost savings

2. This section:

- Costs and quality: higher rates for best borrowers
 - Fintech modes: “other factors” or “models” determine more of the variation in interest rates
-

Variation in Interest Rates

Controls	Model			Shadow Banks	
	Qtr FE	Zip-Qtr FE	Lender FE	Non-Fintech	Fintech
FICO, LTV	Y	N	N	0.303	0.139
FICO, LTV	N	Y	N	0.086	0.070
All	Y	N	N	0.619	0.437
All	N	Y	N	0.495	0.374
Non-Linear	Y	N	N	0.653	0.484
Non-Linear	N	Y	N	0.542	0.425
Non-Linear	N	Y	Y	0.540	0.435

- *Note: we first absorb quarter/quarter-zip FE before calculating R2*
 - Across specifications: Fintech interest rates less explained by observables
-

Model

Objective

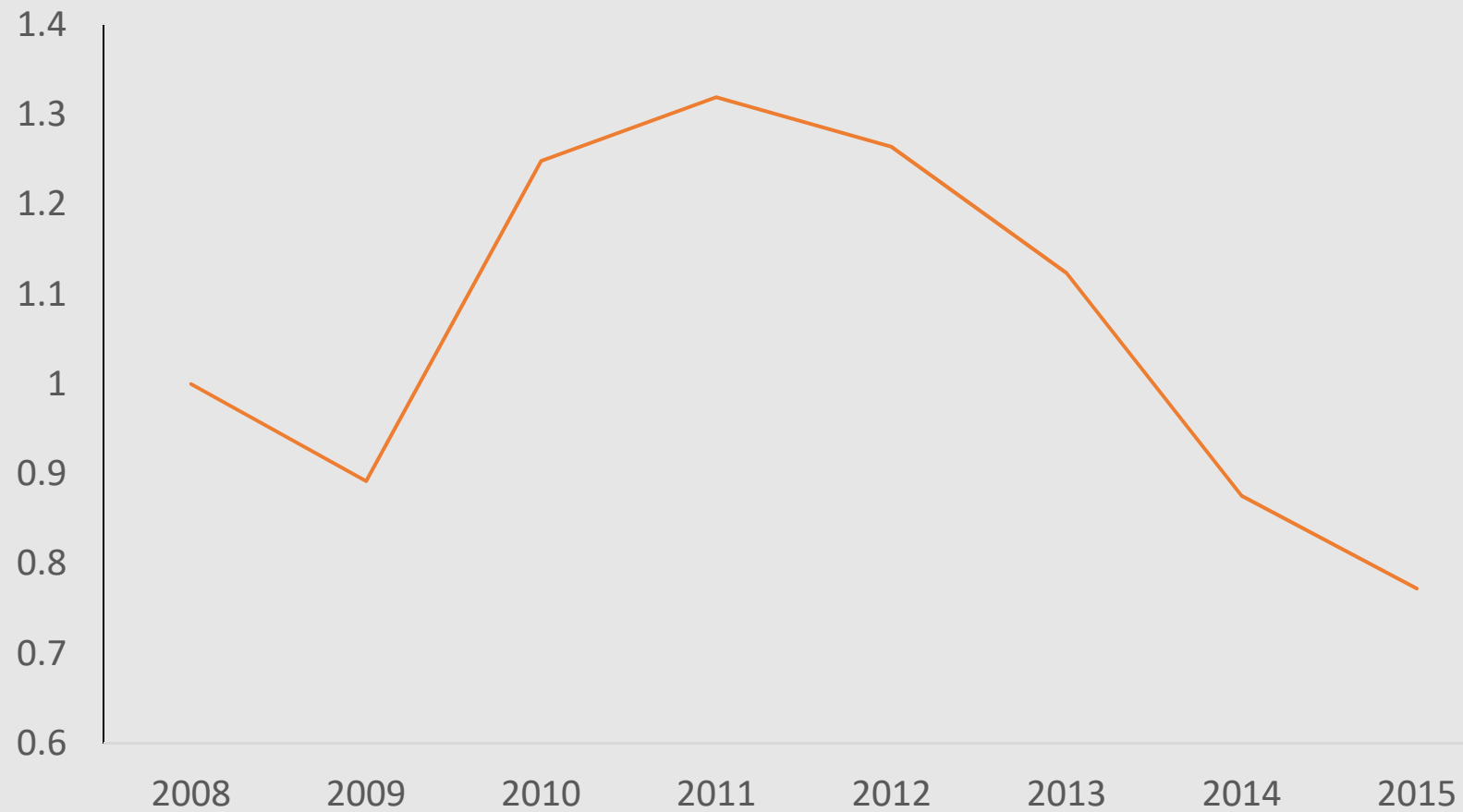
1. What we know so far:

- Shadow banks gain market share in areas where banks are subject to more regulatory oversight.
- *Within* shadow banks, fintech commands significant premium and appears to use better models.

2. Model objectives:

- Combine regulatory and technology effects.
 - Decompose contributions.
 - Counterfactuals turning on/off channels.
-

Calibration: Regulatory Burden

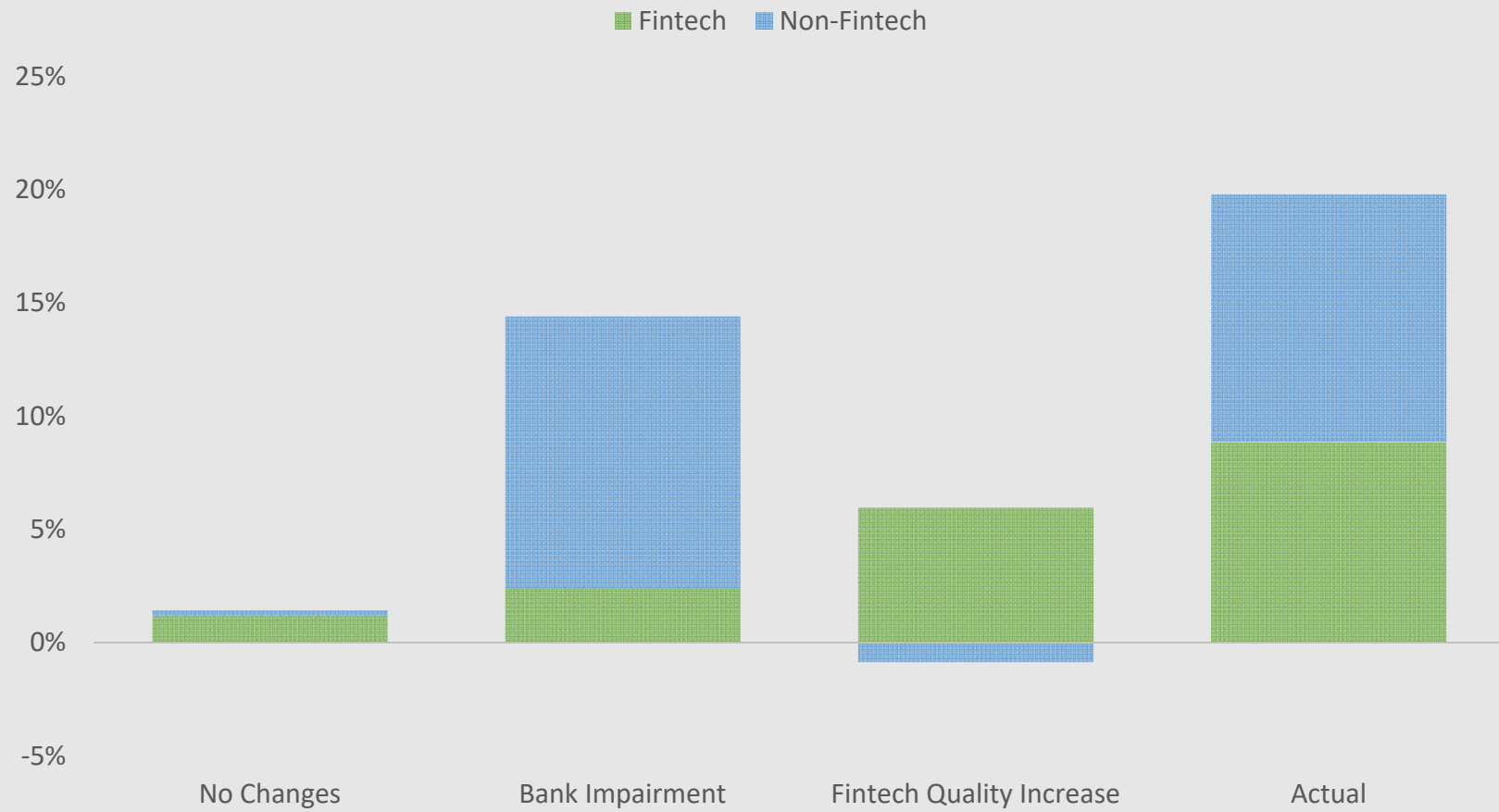


Counterfactuals

1. No fintech, no changes in regulations
2. No fintech, changes in regulations
3. Fintech, no changes in regulation

Observe changes in non-fintech and fintech market shares under each counterfactual

Counterfactuals



Conclusion

Conclusion

Assess role of technology and regulation in recent increase of market disruptors: Focus on largest consumer finance market

1. Regulatory arbitrage seems the dominant force

- Shadow banks now control riskiest segment
- Shadow banks issue large amounts of guarantees on behalf of taxpayers in a lightly regulated market

2. Technology does play role in rise of fintech firms

- Fintech focuses on refinancing already creditworthy borrowers at a high price.
 - Does not appear to democratize credit access
 - Does not appear to reduce cost of credit
-