Fintech, Market Power and Monetary Transmission

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Introduction

The Motivation

- In the aftermath of the Great Financial Crisis (GFC), the Federal Reserve has undertaken various accommodative monetary policies to combat the crisis.
  - Conventional tools: the federal funds rate (FFR) lowed to the zero lower bound (ZLB).
  - Unconventional tools: forward guidance (FG) and large-scale asset purchases (LSAP) through rounds of quantitative easing (QE).
- During the same period, consumer credit markets have witnessed a disruptive force: the rise of fintech companies.
- This paper investigates important questions about the role of new fintech companies in the transmission of monetary policy.
  - How do they respond to monetary policy shocks and;
  - How does their rising market power affect the responses of other lenders, especially banks, to monetary policy.

The Setting

- We explore these questions using data from the U.S. automobile markets in the post-GFC era.
  - Compared to mortgage market, it provides a broader scope in assessing monetary policy effect.
  - It has experienced dramatic organizational changes with the rise of fintech lenders (autofi).
    - leverage advanced **technologies** to offer people new ways to **purchase and finance** cars (e.g., Carvana, CarMax); **direct** lending.
- We exploit several variations that may entail different exposure to monetary policy shocks:
  - lenders that rely on different sources of funds;
    - banks, captives (e.g., Ford Credit), autofi, and other noncaptives
  - prime and nonprime borrowers who face different availability of funds;
  - markets with high or low market power of shadow banks.

The Literature

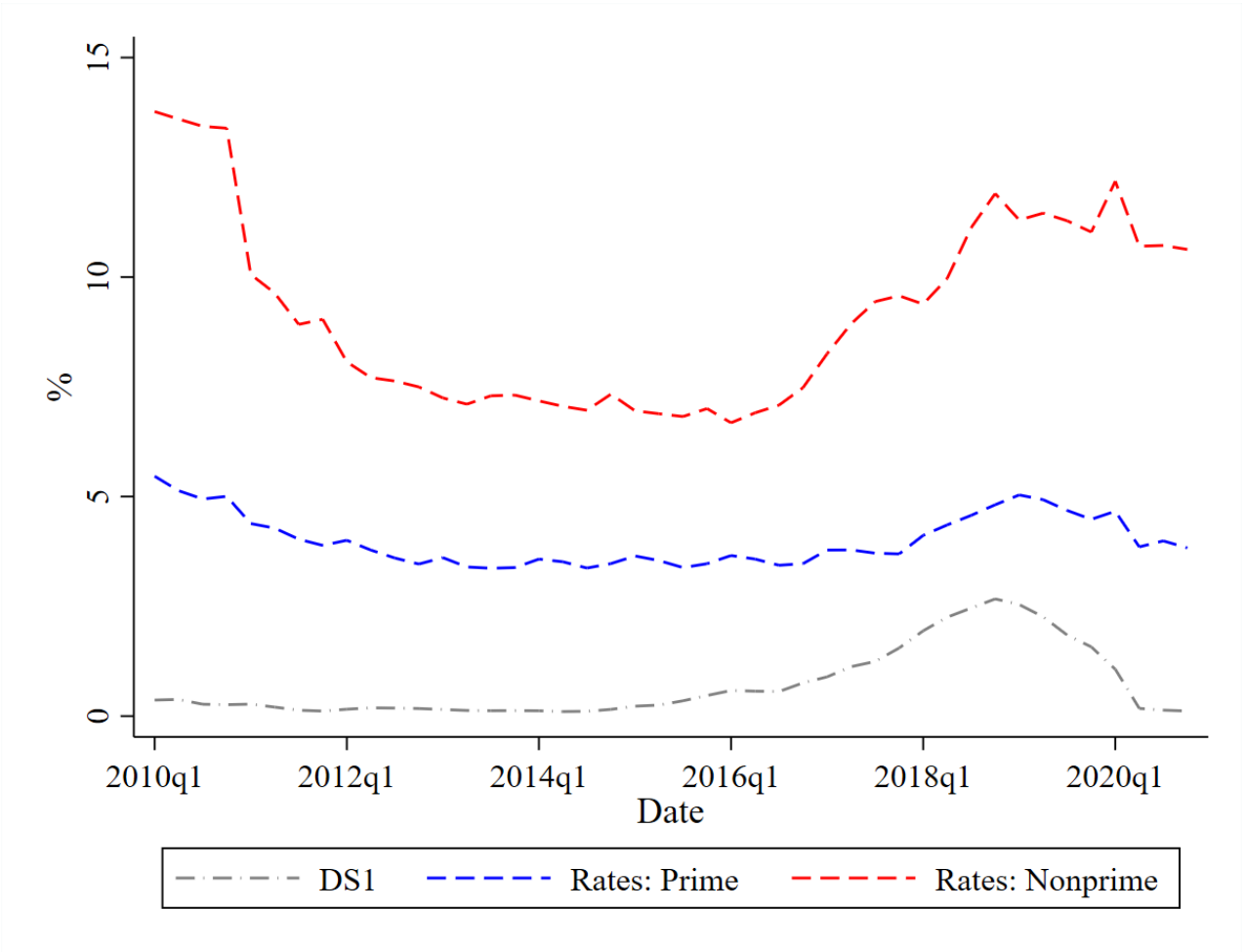
- This paper is related to the extensive literature that examines effects of monetary policies on aggregate outcomes.
  - For example, Romer and Romer (2004); Gürkayanak et al. (2005), Di Maggio et al. (2017), Beraja et al. (2019), Cloyne et al. (2020), Berger et al. (2021).
- Another related literature in monetary economics explores how different financial institutions pass through credit.
  - Drechsler et al. (2017); Xiao(2020).
- A third literature has to do with the risk-taking channel of monetary policy (Chen et al., 2018; Peydró et al., 2020).
  - Our primary scope is to study the effect of local market power—induced by the rise of new fintech lenders—on individual lenders' monetary transmission.

Quick Summary

- Using the LP-IV method, we find that most lenders respond to an increase in the policy rate by significantly increasing the rates they charge on auto loans, and their loan originations contract as a result.
  - However, the magnitude of the responses varies across lenders and borrowers.
- Variation in the market power of noncaptives significantly affects most lenders' responses to the rise in interest rate.
  - Noncaptives were able to pass the rate hike to borrowers to the most extent with their high market power,
  - Their market power also bolsters banks' ability to respond to the increase in policy rate.
- Using the entry of autofi as a quasi-exogenous shock, we find that all three nonautofi lenders have become more responsive to the change in policy rate after the autofi entry.

Data

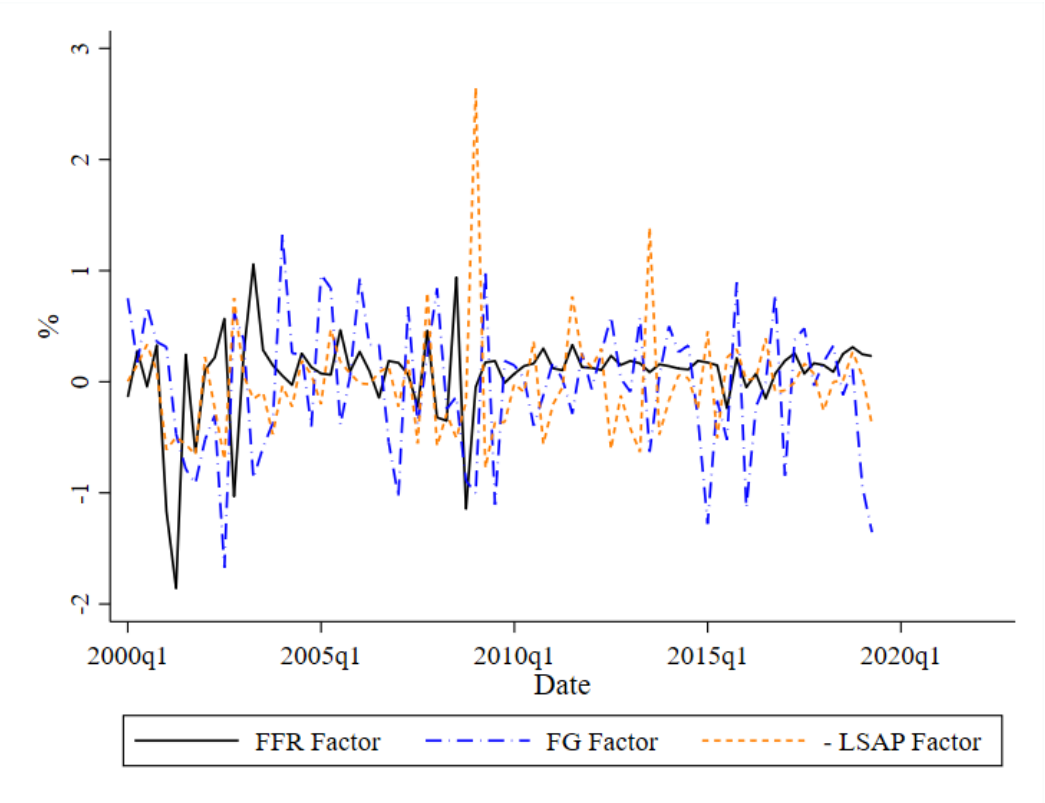
Policy Rate and Note Rates on Auto Loans



- We use the one-year Treasury rate, *GS*1, as the primary measure of monetary policy. note rates on auto loans move up and down following the changes in policy rate, but with some considerable lags.

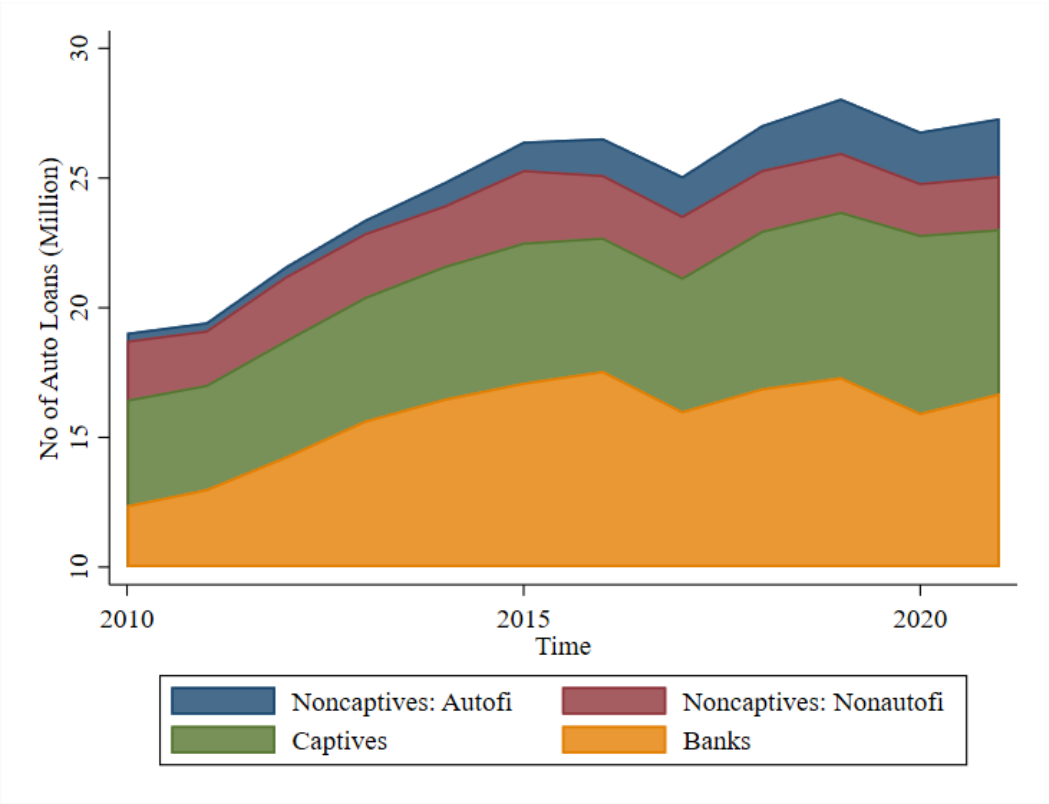
Identifying Monetary Policy Shocks

- Identifying the causal effects of monetary policy requires tackling the potential reverse causality: two-way relationship.



- Both Nakamura and Steinsson (2018) and Swansson (2021) identify immediate causal effect of FOMC announcements using the high-frequency financial data. The latter is more suitable since it separately identify three shocks during the ZLB period.

Market Share



- The rise of autofi, from negligible to more than 7% of the entire market, was driven by the entry of new autofi lenders such as Carvana, as well as expansion of some existing lenders into more markets and more borrowers.

Base Results

Panel Regressions Using Local Projection - Instrument Variable (LP-IV)

$$\begin{aligned}\Delta Y_{i,t+h} &= \alpha_i^h + \sum_{c=1}^{C} \beta_c^h \cdot \mathbf{1}\{i \in c\} \cdot \widehat{R}_t + \sum_{c=1}^{C} \gamma_c^h \cdot \mathbf{1}\{i \in c\} \\ &\quad + \sum_{l=1}^{L} \zeta_l \cdot \Delta Y_{i,t-l} + \epsilon_{i,t+h},\end{aligned} \tag{1}$$

- $\Delta Y_{i,t+h} = Y_{i,t+h} - Y_{t-1}$: the change in auto-lending outcomes by lender i from $t-1$ to $t+h$.
- $\mathbf{1}\{i \in c\}$: lender group c (e.g., banks, captives, and noncaptives).
- R_t: policy rate instrumented by the three monetary policy shocks.
- α_i^h: lender fixed effects.
- Standard errors are clustered by cohort and time.
- β_c^h: heterogeneous effects of monetary policy by different lenders, regions, or households.

Responses of Auto Lending by Lenders

Dep Var	$\Delta Rates_{i,t}$					$\Delta Volume_{i,t}$				
Sample	All	Banks	Captives	Noncaptives		All	Banks	Captives	Noncaptives	
	Lenders			Nonautofi	Autofi	Lenders			Nonautofi	Autofi
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\widehat{GS1}_t$	0.171***	0.202***	0.256***	0.099**	-0.218*	-4.096***	-5.189***	-5.727*	0.139	3.702
	(10.47)	(11.58)	(3.64)	(2.02)	(-1.77)	(-6.54)	(-7.40)	(-1.89)	(0.09)	(1.12)
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	66063	50314	779	12948	2022	66063	50314	779	12948	2022
Adj. R^2	0.272	0.294	0.136	0.229	0.304	0.324	0.320	0.294	0.328	0.418

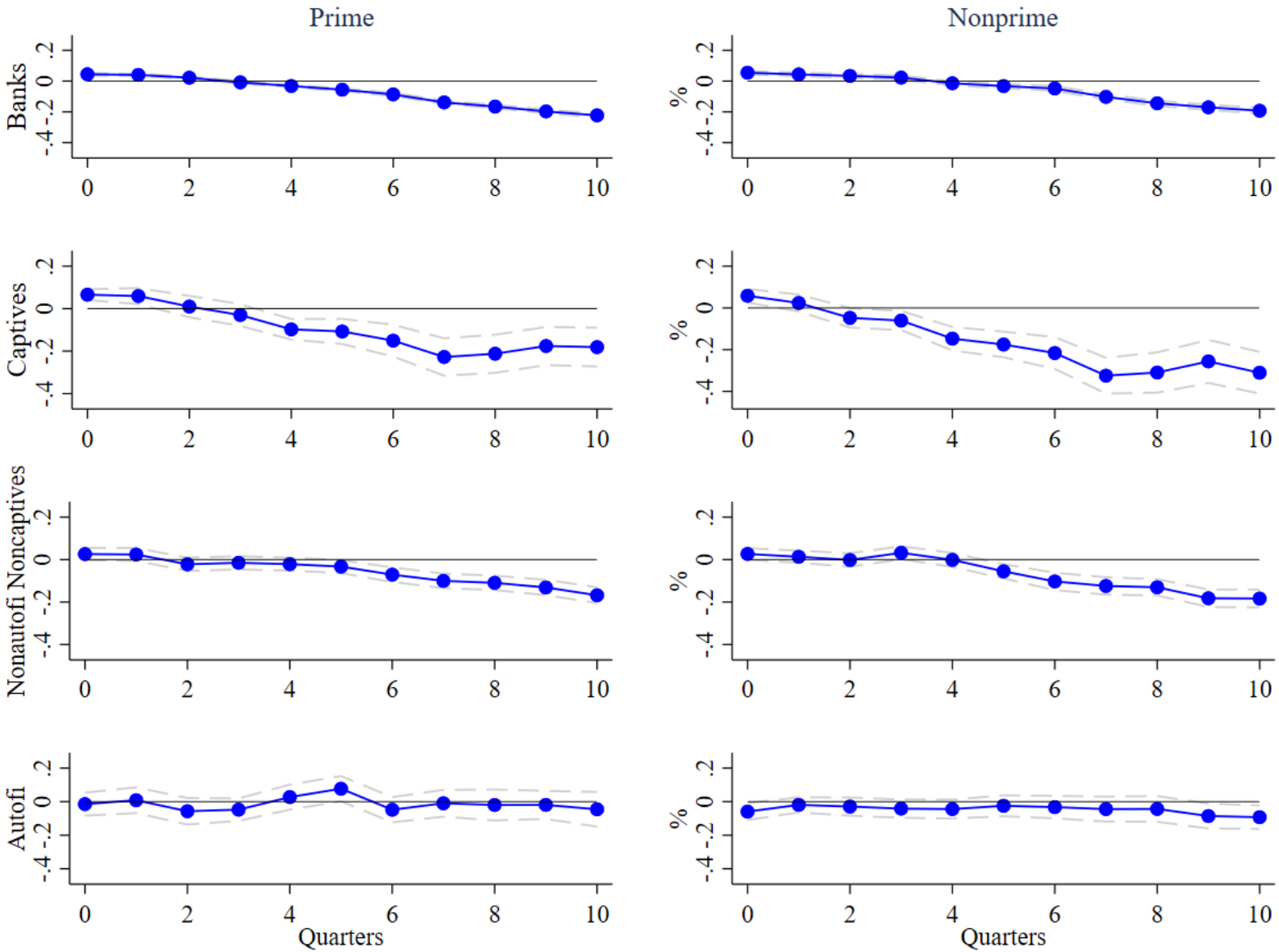
- Banks and captives are the most responsive to the rate hike, by 20.2 and 25.6 bps, respectively, and experience more decline in their lending volume.

Responses of Auto Lending by Lenders and Borrowers

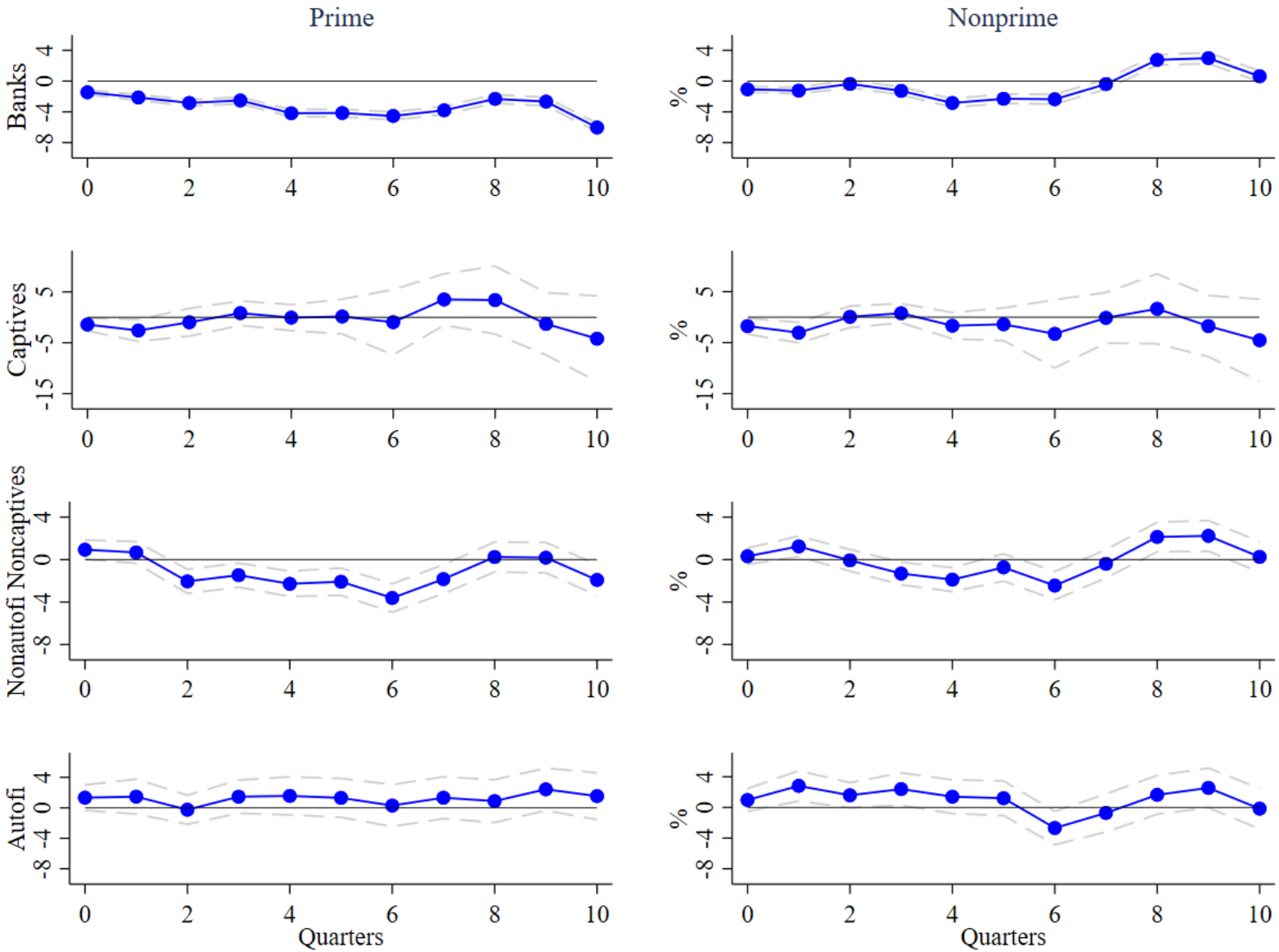
Sample	Prime Loans				Nonprime Loans			
	Banks	Captives	Noncaptives		Banks	Captives	Noncaptives	
			Nonautofi	Autofi			Nonautofi	Autofi
Dep Var	$\Delta Rates_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\widehat{GS1}_t$	0.180***	0.264***	0.116*	-0.060	0.219***	0.229***	0.101	-0.235*
	(9.99)	(4.27)	(1.78)	(-0.36)	(7.83)	(2.98)	(1.54)	(-1.95)
Dep Var	$\Delta Volume_{i,t}$							
$\widehat{GS1}_t$	-5.884***	-5.603*	2.077	5.370	-4.218***	-7.104*	1.442	3.919
	(-7.93)	(-1.84)	(1.02)	(1.42)	(-5.04)	(-1.92)	(0.79)	(1.10)
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	50314	779	12948	2022	50314	779	12948	2022

- The rate hike is passed on slightly more to nonprime borrowers than to prime ones.

Heterogeneous IRFs of Auto Lending Rates



Heterogeneous IRFs of Auto Lending Volume



Market Power

Responses by Market Share of Noncaptives

Dep Var	$\Delta Rates_{i,t}$							
Sample	Prime Loans				Nonprime Loans			
	Banks	Captives	Noncaptives		Banks	Captives	Noncaptives	
			Nonautofi	Autofi			Nonautofi	Autofi
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q1	0.166***	0.364***	0.799*	0.067	0.188***	0.482***	0.601	0.263
	(8.18)	(7.70)	(1.66)	(0.21)	(6.56)	(6.75)	(1.08)	(1.40)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q2	0.163***	0.475***	0.171	0.223***	0.210***	0.478***	0.286**	0.045
	(11.46)	(21.30)	(1.60)	(3.26)	(12.57)	(14.35)	(2.55)	(0.72)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q3	0.169***	0.496***	0.218***	0.372***	0.205***	0.477***	0.072	0.142***
	(10.43)	(23.02)	(4.57)	(6.54)	(11.95)	(15.75)	(1.37)	(2.89)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q4	0.193***	0.469***	0.355***	0.489***	0.255***	0.477***	0.296***	0.326***
	(13.88)	(22.41)	(5.90)	(8.10)	(14.09)	(18.29)	(3.89)	(8.08)
Lender × County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	428615	137622	63871	23666	428615	137622	63871	23666

- Noncaptives increase their rates on nonprime loans by the most, among all lenders, in markets with the highest noncaptives' share.

Responses by Market Share of Noncaptives

Dep Var	$\Delta Volume_{i,t}$							
Sample	Prime Loans				Nonprime Loans			
	Banks	Captives	Noncaptives		Banks	Captives	Noncaptives	
			Nonautofi	Autofi			Nonautofi	Autofi
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q1	-2.938***	-0.147	-13.765**	9.362	-2.578***	1.679	-4.621	-5.464
	(-4.38)	(-0.10)	(-2.52)	(0.70)	(-2.79)	(0.80)	(-0.66)	(-0.88)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q2	-1.605***	-0.774	-4.309***	-6.021**	-3.677***	-2.999***	-7.975***	2.952
	(-3.62)	(-1.14)	(-2.68)	(-2.42)	(-6.95)	(-3.41)	(-4.51)	(1.36)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q3	-1.578***	-1.940***	-5.889***	-6.455***	-5.964***	-2.735***	-5.961***	-3.101*
	(-3.50)	(-3.14)	(-4.87)	(-3.23)	(-10.83)	(-3.37)	(-4.55)	(-1.92)
$\widehat{GS1_t}$ × Noncaptives Share$_i$: Q4	-2.056***	-1.786***	-5.725***	-2.935*	-6.600***	-2.280***	-6.810***	-0.676
	(-4.61)	(-3.13)	(-6.24)	(-1.82)	(-13.11)	(-3.05)	(-6.76)	(-0.56)
Lender × County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	428615	137622	63871	23666	428615	137622	63871	23666
Adj R^2	0.275	0.342	0.322	0.397	0.295	0.355	0.288	0.340

- Banks lose more nonprime business in places where noncaptives have higher market share.

Responses by Market Share of Autofi

Dep Var	$\Delta Rates_{i,t}$					
Sample	Prime Loans			Nonprime Loans		
	Banks	Captives	Noncaptives Nonautofi	Banks	Captives	Noncaptives Nonautofi
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{GS1_t}$ × Autofi Share$_i$: Low	0.158***	0.408***	0.268***	0.194***	0.457***	0.200**
	(11.58)	(17.86)	(3.88)	(11.33)	(12.79)	(2.45)
$\widehat{GS1_t}$ × Autofi Share$_i$: Med	0.183***	0.467***	0.277***	0.208***	0.504***	0.209**
	(11.75)	(20.18)	(3.44)	(11.51)	(15.51)	(2.07)
$\widehat{GS1_t}$ × Autofi Share$_i$: High	0.183***	0.516***	0.297***	0.254***	0.475***	0.264***
	(14.80)	(28.20)	(4.90)	(16.35)	(21.09)	(3.71)
Lender × County FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	428615	137622	63871	428615	137622	63871
Adj R^2	0.293	0.303	0.321	0.326	0.335	0.305

- Banks increase their rates on nonprime loans in markets with a high autofi share by 6.0 bps more. Similarly for nonautofi noncaptives.

Responses by Market Share of Autofi

Dep Var	$\Delta Volume_{i,t}$					
Sample	Prime Loans			Nonprime Loans		
	Banks	Captives	Noncaptives Nonautofi	Banks	Captives	Noncaptives Nonautofi
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{GS1}_t \times$ Autofi Share$_i$: Low	-2.050***	-0.012	-6.335***	-4.119***	-2.066**	-5.488***
	(-5.28)	(-0.02)	(-4.02)	(-8.20)	(-2.12)	(-3.46)
$\widehat{GS1}_t \times$ Autofi Share$_i$: Med	-0.750	-1.238*	-5.620***	-3.484***	-1.793**	-6.661***
	(-1.50)	(-1.75)	(-4.11)	(-6.06)	(-2.00)	(-4.60)
$\widehat{GS1}_t \times$ Autofi Share$_i$: High	-2.487***	-2.428***	-4.358***	-7.104***	-2.844***	-7.426***
	(-6.35)	(-5.08)	(-4.26)	(-15.79)	(-4.59)	(-7.50)
Lender × County FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	428615	137622	63871	428615	137622	63871
Adj R^2	0.275	0.342	0.325	0.295	0.355	0.288

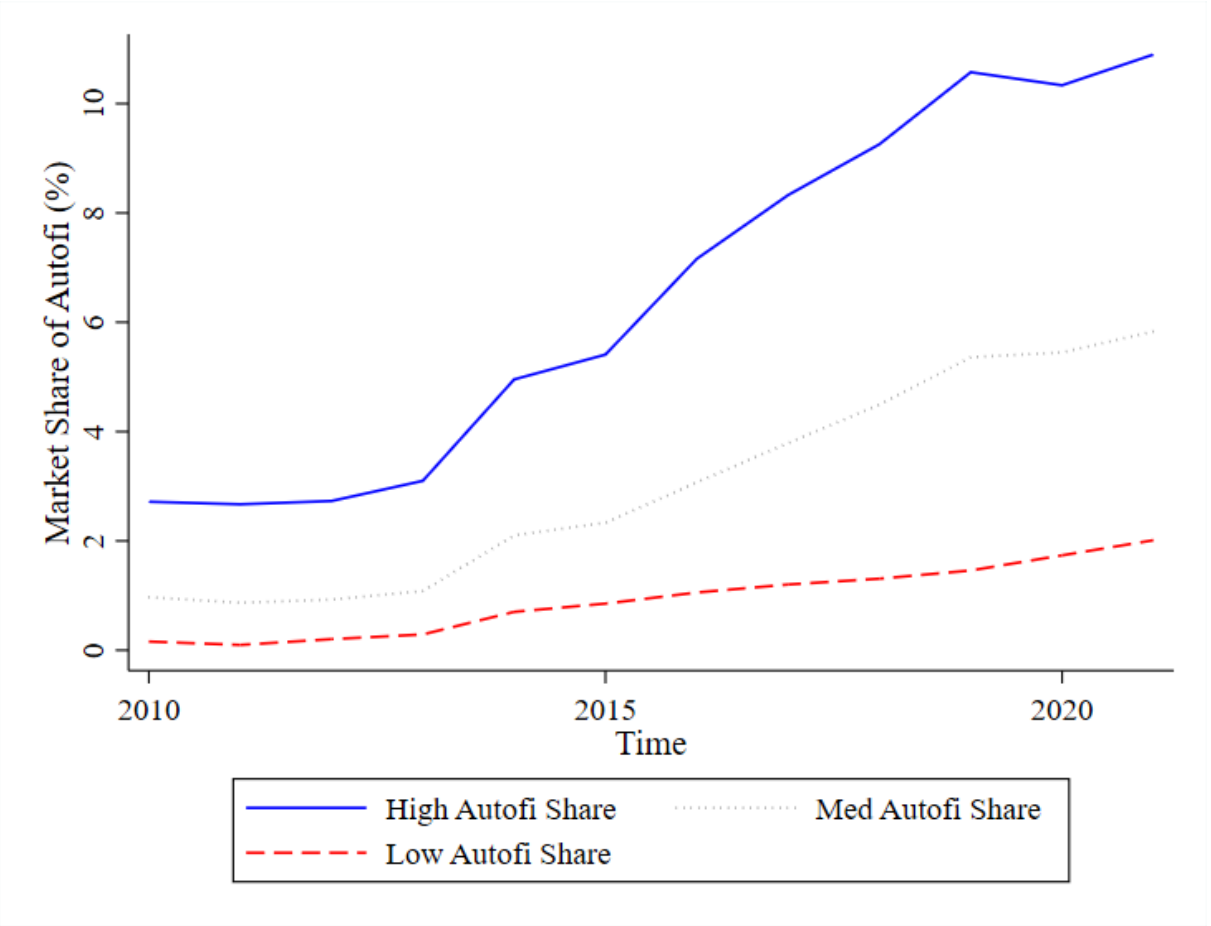
- Banks see their nonprime loan volume in markets with a high share of autofi drop by 3 pp more.

Event Study

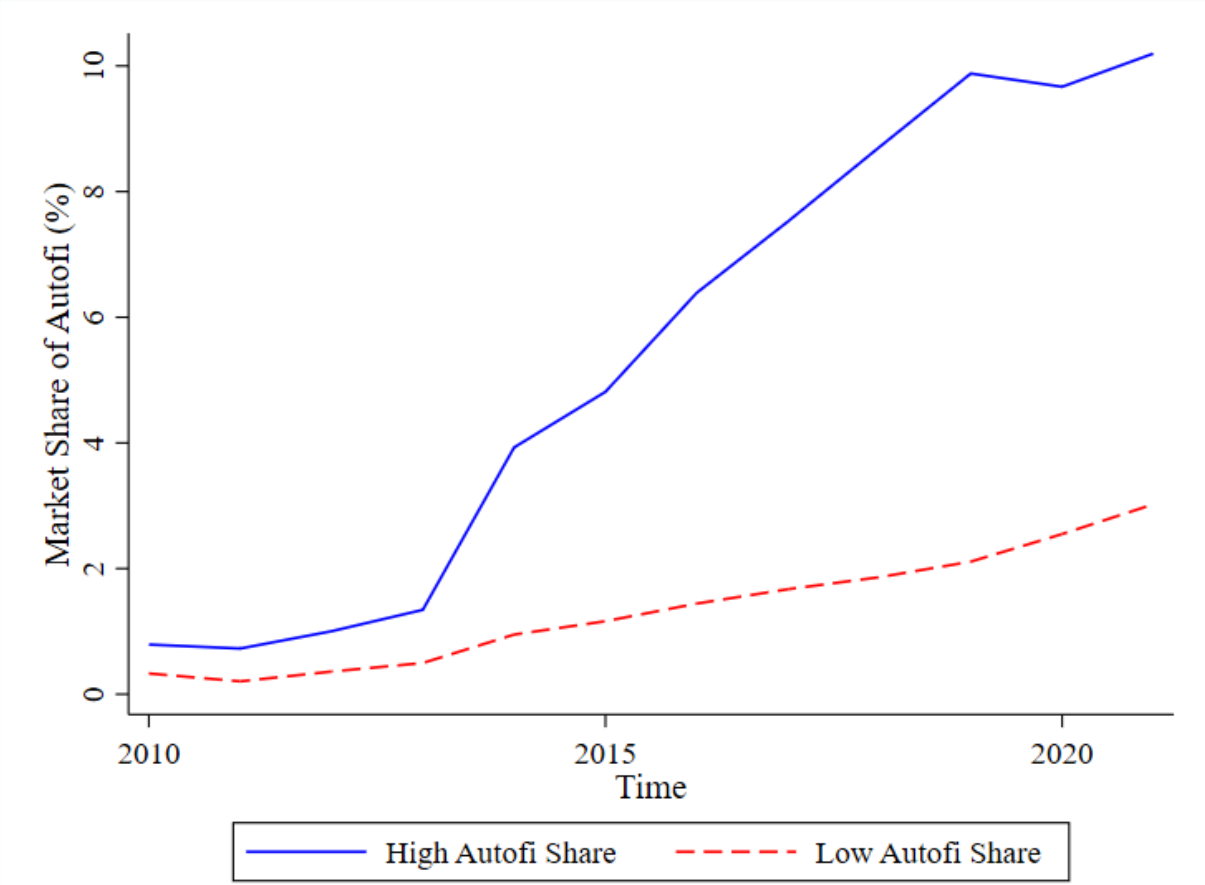
Matched Sample

- The entry of autofi into a particular local market is a highly endogenous decision, largely determined by the existing market competition, availability of targeted borrowers, and local regulations.
- To address the selection concern, we match the low- to high-share using a propensity score matching (PSM) procedure.
  - Local auto-market conditions: HHI, average quarterly number of auto loans, market shares of noncaptives and autofi in 2010;
  - Local demographic characteristics: household median income and population, unemployment rate, percent of people with a bachelor's degree, and percent of people in poverty.

Autofi Share before Matching



Autofi Share after Matching



- The two sets of counties appear to have very similar autofi market share, both below 1%, before 2014, but they increasingly diverge over time.

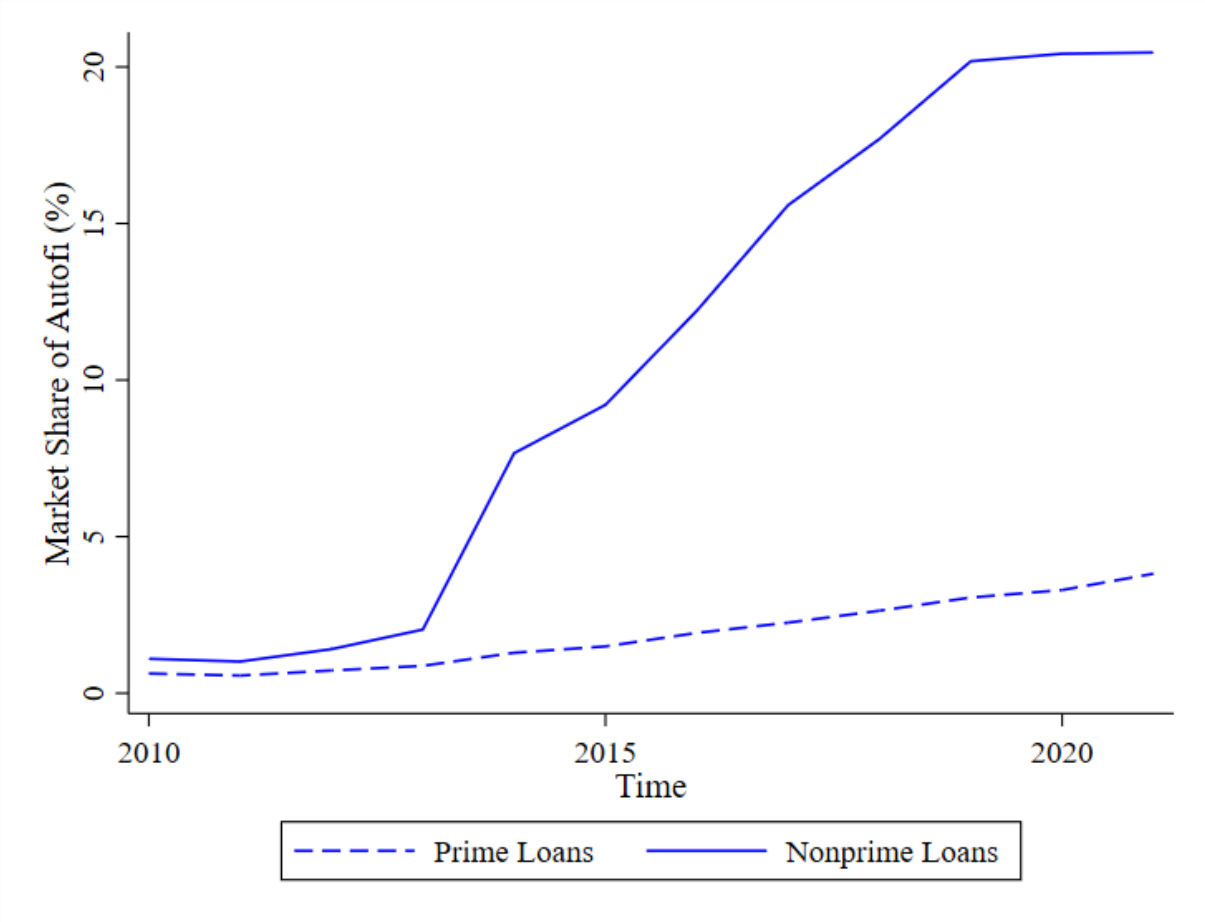
Responses by Market Share of Autofi

Dep Var	$\Delta Volume_{i,t}$					
Sample	Prime Loans			Nonprime Loans		
	Banks	Captives	Noncaptives	Banks	Captives	Noncaptives
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{GS1}_t \times$ Autofi Entry: Year -2	-0.473***	0.115***	-0.346***	-0.286***	-0.041	-0.492***
	(-23.25)	(4.13)	(-4.62)	(-11.01)	(-1.11)	(-6.94)
$\widehat{GS1}_t \times$ Autofi Entry: Year -1	-0.248***	0.057**	-0.831***	-0.217***	0.069*	-0.055
	(-12.64)	(2.00)	(-9.43)	(-8.20)	(1.72)	(-0.89)
$\widehat{GS1}_t \times$ Autofi Entry: Year +1	0.129***	0.164***	0.395***	0.200***	0.229***	-0.254***
	(7.83)	(5.51)	(5.98)	(8.70)	(5.18)	(-3.69)
$\widehat{GS1}_t \times$ Autofi Entry: Year +2	0.153***	0.012	0.597***	0.217***	0.182***	0.286***
	(11.04)	(0.43)	(9.81)	(10.97)	(4.28)	(5.09)
$\widehat{GS1}_t \times$ Autofi Entry: Year +3	0.394***	0.243***	0.368***	0.514***	-0.000	0.071
	(19.42)	(6.50)	(4.99)	(19.09)	(-0.00)	(0.93)
$\widehat{GS1}_t \times$ Autofi Entry: Year +4	0.298***	0.509***	0.394***	0.338***	0.594***	0.181***
	(21.77)	(21.07)	(8.34)	(17.36)	(16.29)	(3.59)
$\widehat{GS1}_t \times$ Autofi Entry: Year +5	0.646***	0.653***	0.592***	0.626***	0.622***	0.226***
	(55.23)	(27.94)	(12.55)	(38.66)	(19.72)	(5.16)
$\widehat{GS1}_t \times$ Autofi Entry: Year +6	0.296***	0.417***	0.356***	0.278***	0.233***	0.077*
	(27.20)	(18.55)	(7.56)	(18.38)	(7.93)	(1.65)
Lender × County FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	203376	68814	31526	203376	68814	31526

Responses by Market Share of Autofi

Dep Var	$\Delta Volume_{i,t}$					
Sample	Prime Loans			Nonprime Loans		
	Banks	Captives	Noncaptives	Banks	Captives	Noncaptives
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{GS1_t}$ × Autofi Entry: Year -2	3.753***	-11.948***	4.512***	5.475***	3.407***	8.719***
	(6.35)	(-15.20)	(2.90)	(7.11)	(3.47)	(6.16)
$\widehat{GS1_t}$ × Autofi Entry: Year -1	-1.872***	3.173***	19.105***	2.284***	6.988***	14.000***
	(-3.43)	(3.34)	(9.68)	(3.24)	(6.27)	(8.32)
$\widehat{GS1_t}$ × Autofi Entry: Year +1	1.206**	-4.604***	6.901***	-5.072***	-0.926	-2.920
	(2.02)	(-4.80)	(3.58)	(-6.95)	(-0.78)	(-1.63)
$\widehat{GS1_t}$ × Autofi Entry: Year +2	-0.299	1.735**	0.739	-8.115***	1.422	2.984*
	(-0.56)	(2.10)	(0.43)	(-12.68)	(1.47)	(1.81)
$\widehat{GS1_t}$ × Autofi Entry: Year +3	-9.962***	-15.115***	-1.011	-15.304***	-18.586***	-12.424***
	(-12.28)	(-11.59)	(-0.43)	(-15.55)	(-13.00)	(-4.75)
$\widehat{GS1_t}$ × Autofi Entry: Year +4	-0.426	-4.445***	-10.087***	-16.217***	-9.294***	-27.903***
	(-0.59)	(-5.58)	(-6.64)	(-22.88)	(-10.19)	(-16.99)
$\widehat{GS1_t}$ × Autofi Entry: Year +5	-4.894***	-0.284	2.086	-13.511***	-2.840***	-10.151***
	(-10.22)	(-0.38)	(1.58)	(-22.45)	(-3.15)	(-6.55)
$\widehat{GS1_t}$ × Autofi Entry: Year +6	-2.696***	-3.569***	-2.354**	-8.349***	-6.119***	-6.980***
	(-5.94)	(-5.14)	(-2.04)	(-15.47)	(-8.19)	(-5.93)
Lender × County FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	203376	68814	31526	203376	68814	31526

Autofi Penetration for Prime and Nonprime Loans

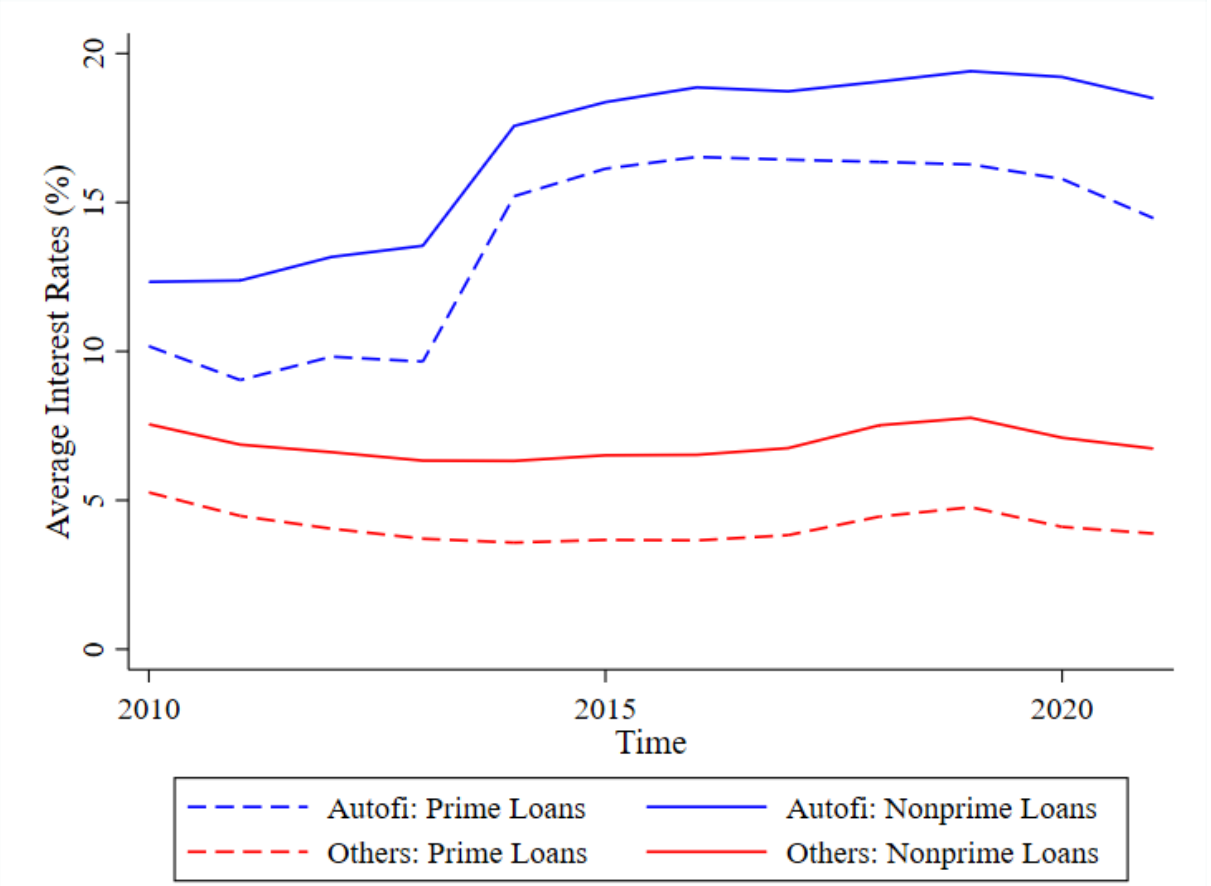


- Autofi penetration is primarily in the nonprime market.

Changes in Nonautofi Loan Volume

- The entry and rapid expansion of autofi affects other lenders, primarily in the nonprime segment, resulting in revenue losses to them.

Differences in Loan Rates



- Fintech loans are much more expensive, either because of borrowers' poor credit or the use of big data and machine learning techniques. Some of these may have been learned by other lenders.

Conclusions

Conclusions

- This paper studies the role of new fintech companies in the transmission of monetary policy. Following an increase in policy rate,
  - Most lenders respond by significantly increasing the rates on auto loans, and their loan originations contract as a result.
  - Banks and captives being the most responsive among all lenders.
  - Traditional noncaptives only increase their rates marginally and with a smaller magnitude.
  - New autofi lenders cut their rates instead as they look to expand their market share.
- Individual lender's responses are affected by the market power of shadow banks in the local market.
  - Lenders increase rates by significantly more in markets with the high noncaptives' share.
  - Noncaptives' high market power not only allows them to pass the rate hike to borrowers to the greatest extent, but it also bolsters banks' ability to respond to the monetary policy shocks.
- Relative to loans in the control counties and year of autofi entry, lenders increase their rates in the treated counties by more following the entry.
  - Existing lenders have become more responsive to monetary policies following the autofi entry.