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Bank Competition and Entrepreneurial Gaps: Evidence from Bank Deregulation

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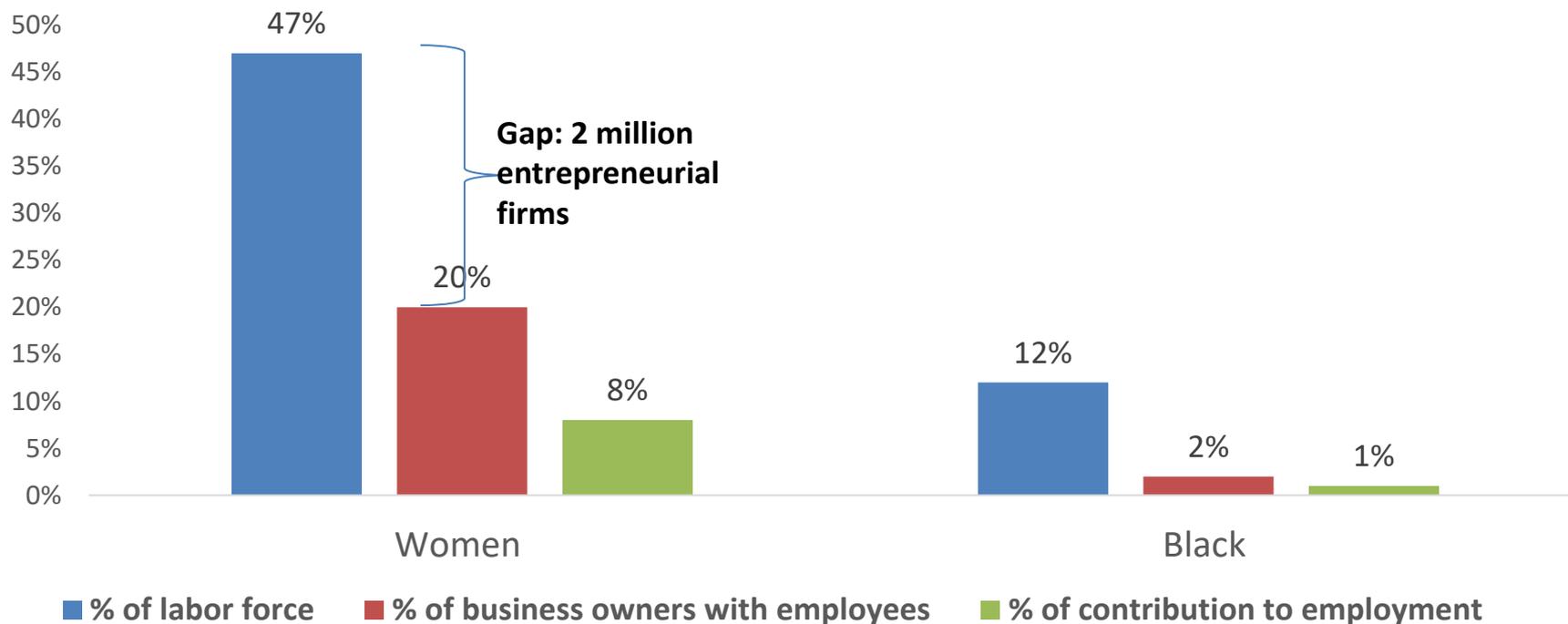
Outline

- Introduction
- Data
 - Data Sources and Sample Selection
 - Summary Statistics
- Bank Deregulation Index
 - Background: IBBEA and Dodd-Frank Act
 - Evolution
- Result I: Effects of Bank Deregulation on Bank Services
 - Minorities are underserved
 - Bank deregulation can improve the quantity and quality of bank services
 - Bank deregulation can reduce discrimination
- Result II: Bank Deregulation Reduces Entrepreneurial Gaps
 - Business formation
 - Business capital
 - Business performance
 - Access to PPP loans
- Conclusion and Policy Implications

Motivation: Entrepreneurial Gaps

- Entrepreneurship boosts economic growth by driving job creation and innovation
 - Haltiwanger, Jarmin, and Miranda, 2013; Andrews, Chatterji, Lerner, and Stern 2022
- Reducing the entrepreneurial gaps may drive economic growth and reduce inequality
 - Ideally, if the number of firms owned by women were proportional to their distribution in the labor force, numerous entrepreneurial firms and jobs would be added to the U.S. economy

Gender and Racial Gaps (Source: 2018 Annual Business Survey)



Motivation: Bank Loans and Entrepreneurial Gaps

- Cause: Financial frictions may cause entrepreneurial gaps (Ewens and Townsend 2020; Ewens, 2022)
 - The most important factor that determines the success of minority-owned firms: Startup capital (Fairlie and Robb, 2010)
 - Capital structure: Bank loans (Robb and Robinson, 2014)
 - Minorities and women are disadvantaged groups in the lending market (Asiedu, Freeman, and Nti-Addae, 2012; Fairlie, Robb, and Robinson, 2022)
 - Higher rejection rates and borrowing costs because of discrimination
- Potential solution: **Becker's discrimination theory** predicts that competition can reduce discrimination

- **Research question:** Can bank competition narrow entrepreneurial gaps by reducing discrimination in the lending market?
 - Yes: Competition increases the cost of discrimination
 - Not necessarily: Competition may move banks away from relationship-based lending which is well-suited to overcome asymmetric information problems
- **Challenges:**
 - A direct measure of discrimination free of omitted variables problem
 - Exogenous shocks to financial market competition
- **Solutions:**
 - Uses Consumer Financial Protection Bureau (CFPB) complaint dataset and builds a direct measure of discrimination from the narrative information in complaints against banks using textual analysis
 - Exploits **staggered interstate deregulation law changes** and builds state-level bank deregulation index (Rice and Strahan, 2010)
 - The Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA), effective in 1994
 - The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act), effective in 2010

Preview of Main Result I: Bank Outcomes

- Bank deregulation can reduce gaps in the quantity and quality of banking services:
- **Quantity of banking services and financial inclusion**
 - **Before deregulation:** Minority communities are underserved by banks: lower branch density
 - **After deregulation:** (1) Branch density in minority communities increases (2) Increased branch density translates into financial inclusion of minorities
- **Quality of banking services:**
 - **Before deregulation:** Minority communities receive low-quality banking service measured by the number of complaints filed to the CFPB
 - **After deregulation:** Quality of banking services in minority communities improves
- **Discrimination:**
 - Develop a **new measure** of discrimination using textual analysis
 - Deregulation **reduces** complaints about discrimination because of intensified competition

Preview of Main Result II: Entrepreneurship Outcomes

- Bank deregulation can reduce entrepreneurial gaps:
- **Business formation:**
 - In fully deregulated states, the gender and racial gap can be reduced by 39% and 70%
- **Startup capital:**
 - Minority and female entrepreneurs can raise more **secured business debt and home equity loans** after deregulation
- **Business performance:**
 - The gaps in business performance are reduced by bank deregulation

- **How to reduce gender and racial gaps in entrepreneurship**
 - Gender gap: Gender stereotypes of venture capitalists (Ewens and Townsend 2020; Hebert, 2020), equal inheritance rights (Naaraayanan, 2019), and reproductive rights (Zandberg, 2021)
 - **Contribution:** Access to bank loans can reduce both gender and racial gaps
- **How to measure discrimination**
 - Racial gaps in rejection rates: Bartlett et al. (2022)
 - **Weakness:** Omitted variables like discount points (Bhutta and Hizmo, 2021)
 - **Contribution:** Build a direct measure from the narrative information in complaints against banks using textual analysis
 - **Applications:**
 - Help CFPB to detect lending discrimination
 - Useful in other settings: detect discrimination against consumers (e.g., Better Business Bureau), employees (e.g., Glassdoor)

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- Bank deregulation index (1994-2021): Westlaw
- Bank outcomes:
 - Bank branch information (1994-2021) : FDIC
 - Complaints against banks (2012-2021): CFPB
 - PPP loans (2020): Small Business Administration (SBA)
- Entrepreneurship outcomes:
 - Entrepreneurship (1990-2019): Survey of Income and Program Participation (SIPP)
 - **Comprehensive:** Demographic characteristics, job status, firm characteristics, financing conditions
 - **Longitudinal:** At each panel, SIPP tracks around 30,000 individuals for around 36 months
 - Data coverage: Eleven panels (1990, 1991, 1992, 1993, 1996, 2001, 2004, 2008, 2014, 2018, 2019), 326,809 individuals
 - Filter for age: 22-60 years old

▶ Summary Statistics

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Bank Deregulation: IBBEA

- I rely on two acts to capture **staggered** state-level bank deregulation changes: IBBEA (1994) and Dodd-Frank Act (2010)
- The Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994
 - Following its passage, banks outside the state may be allowed to open branches across state lines without permission
 - **Staggered changes:** States are allowed to use the four provisions contained in IBBEA to restrict or increase the cost of out-of-state entry
 - **Deregulation index = 4 – number of barriers**
 - 0 = fully regulated
 - 4 = fully deregulated

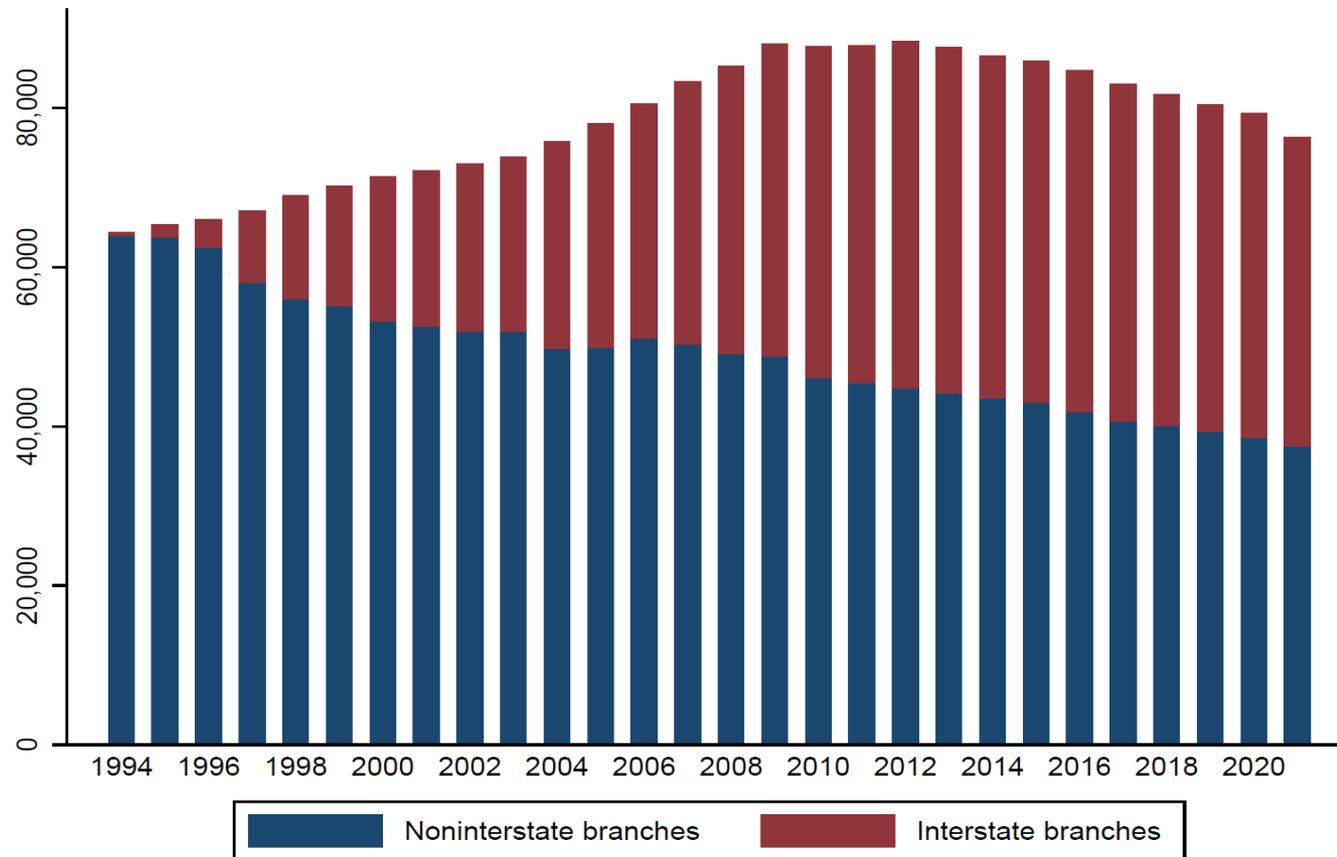
Provisions in IBBEA	Subtract one from the index if
Minimum age requirement for target bank of interstate acquirers	The minimum age requirement is three years old or more
State permission of de novo interstate branching	Not permitted
State permission of interstate branching by acquiring a single branch or portions of an institution	Not permitted
Statewide deposit cap on branch acquisitions	Less than 30%

Bank Deregulation: Dodd-Frank Act

- The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act)
 - **One-time shock:** Section 613 of the Dodd-Frank Act allows out-of-state banks to establish a de novo branch into any other state as if they were chartered in that state, effective in 2010
 - **Timing is seemingly exogenous:**
 - **Cause:** Great Recession
 - **Nationwide act:** Beyond the control of state government and thus plausibly exogenous to the local economic conditions and entrepreneurial financing need
 - **Impact states differently:** The Dodd-Frank Act only affects states that do not allow de novo branching before the Dodd-Frank Act
 - **Measurement:** Add one to the bank deregulation index if a state does not allow de novo branching before the Dodd-Frank Act

Number of FDIC-insured Commercial Bank Branches in the U.S. 1994-2021

This figure shows the total number of insured noninterstate and interstate branches in the U.S from 1994 to 2021. Data are from the FDIC.

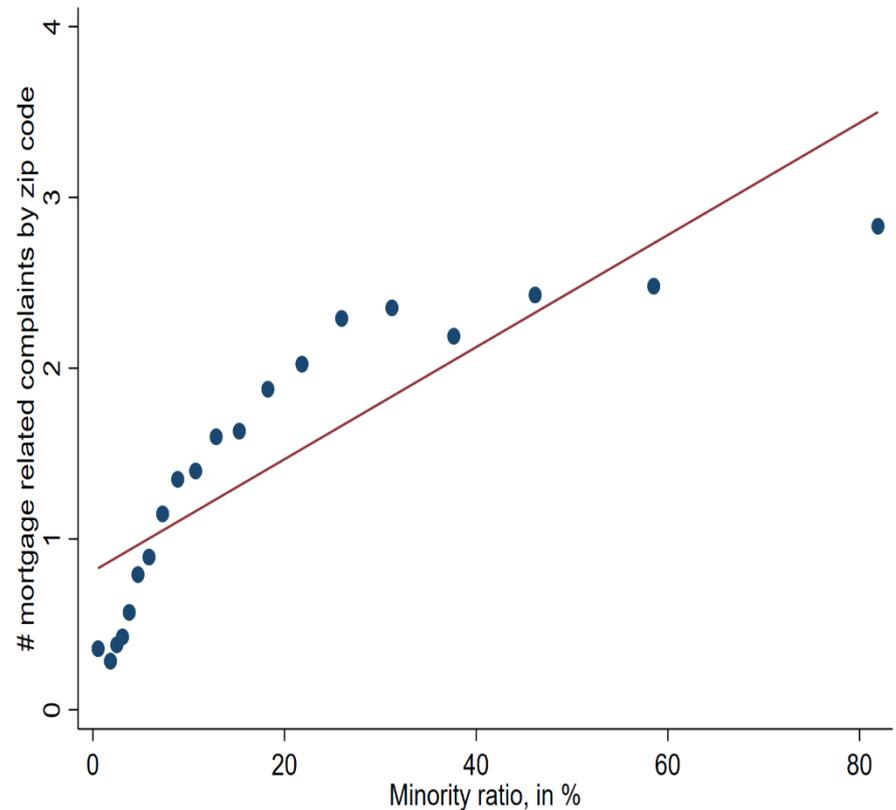
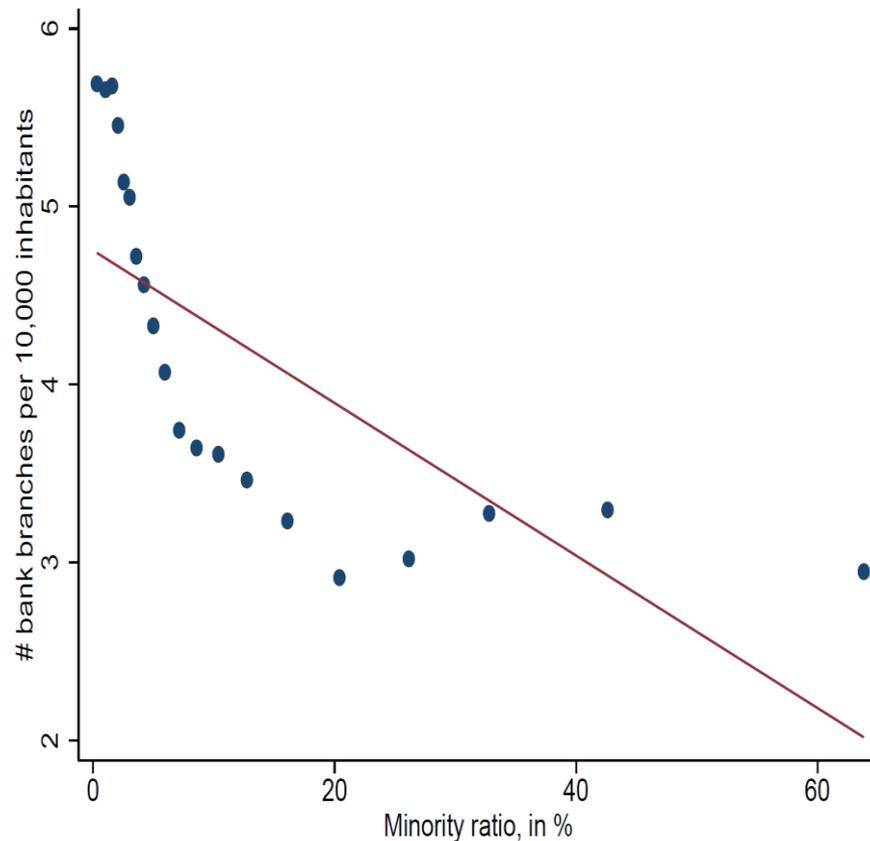


- The total number of interstate branches increases because of bank deregulation
- Deregulation leads to a more competitive financial market (Bushman, Hendricks, and Williams, 2016)

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Minority Communities Are Underserved by Banks



- Quantity: Minority communities have lower quantity of branch coverage (county level)
- Quality: Minority communities have more mortgage-related complaints (zip code level)
- Data: Census, FDIC, and CFPB

Bank Deregulation and Bank Services in Minority Communities

Categories	Quantity of bank services and financial inclusion		Quality of bank services
	(1) Log (branch density)	(2) Dummy: open a bank account	(3) Log (total number of complaints)
Outcome variables			
Deregulation index × minority community dummy	0.029*** (0.011)	-	-0.054*** (0.019)
Deregulation index × minority individual dummy	-	0.011** (0.004)	-
Dataset	FDIC	SIPP	CFPB
Unit of observation	County	Individual	Zip code

A one-unit increase in bank deregulation in minority communities:

- 2.9% increase in the bank branch density
- 1.1% increase in the probability of opening a bank account
- 5.4% decrease in complaints

An example of a complaint about discrimination

Date received	2021/1/28
Product	Mortgage
Subproduct	Conventional home mortgage
Issue	Applying for a mortgage or refinancing an existing mortgage
Company	BANK OF AMERICA, NATIONAL ASSOCIATION
State	PA
Zip code	19003
Submitted via	Web

Company response to consumer

Closed with monetary relief

I believe that I am being **discriminated** against because I disclosed my **race** as XXXX on Section X of the XXXX loan application. I would greatly appreciate it if this could be looked into to ensure that Bank of America didn't discriminate against me by showing that they also denied mortgage loans to people of other races, particularly XXXX people, with similar credit, income or debt-to-income ratio, savings, educational, and employment backgrounds as me.

Quick summary of my background : **I have excellent credit**, my credit score is over XXXX. My 2 employment gaps greater than 30 days were related to school. I have a XXXX XXXX XXXX and currently in XXXX XXXX seeking a XXXX. I work full time as a mortgage loan advisor where I earn over {\$45000.00} annually. I have savings of {\$30000.00}. The house I was looking to purchase cost {\$180000.00}.

Consumer complaint narrative

- **Discrimination measurement:** If the narrative includes the words “discrimination”, “unfair”, “inequity”, “prejudice”, “injustice” or other related words
- **Validation:** Minorities have higher rejection rates in banks with high volume of discrimination complaints

The Effect of Bank Deregulation on Discrimination

Outcome variables	(1) 1 (discrimination complaints)	(2) Log (total number of complaints about discrimination)
Deregulation index × minority community	-0.040*** (0.019)	-0.028*** (0.007)
Dataset	CFPB	CFPB
Fixed effects	Zip code, state-year, MSA-year	Zip code, state-year, MSA-year
Unit of observation	Zip code	Zip code

- **A one-unit increase in bank deregulation in minority communities:**
 - 4.0 % decrease in the probability of the incidence of discrimination complaints
 - 2.8% decrease in the volume of discrimination complaints
 - Results are mainly driven by **incumbent banks**

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The Effect of Bank Deregulation on Entrepreneurship Gaps

Categories	Business formation		Business funding	
	(1) Dummy: entrepreneur	(2) Log (secured business debt)	(3) Log (mortgage debt)	
Deregulation index × minority dummy	0.003*** (0.001)	0.097*** (0.034)	0.245*	(0.132)
Deregulation index × woman dummy	0.003** (0.001)	0.201* (0.090)	0.120	(0.138)
Dataset	SIPP	SIPP	SIPP	SIPP
Unit of observation	Individual	Entrepreneur	Entrepreneur	Entrepreneur

Additional results:

- Bank competition reduces the gaps in:
 - business performance and business equity
 - access to the Paycheck Protection Program (PPP) loans
- These effects are stronger in
 - areas with high discrimination
 - industries relying heavily on external financing

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Conclusion

- In this paper, I took advantage of two important bank deregulation episodes to analyze the effect of access to finance on entrepreneurial gaps
- I find the following:
 - (i) Competition can reduce gender and racial gaps in entrepreneurship (business formation, business startup capital, business performance, and business equity)
 - (ii) Channels: Bank competition can improve the quantity and quality of services and reduce discrimination
- Policy implications:
 - (i) Underscores the need for policy intervention aimed at financial inclusion for female and minority entrepreneurs in the entrepreneurial financing market
 - (ii) Detect and disclose discrimination may reduce discriminatory treatment

Thank you!

Appendix: Summary Statistics

Mean value	Men	Women	White	Minority	Total
<i>Panel A: Sociodemographics</i>					
Dummy: New entrepreneur	0.061	0.040	0.055	0.041	0.051
Number of children	0.791	0.865	0.737	1.045	0.828
Family size (number of adults)	2.146	2.088	2.057	2.261	2.117
Age (year)	37.457	38.054	38.150	36.789	37.749
Dummy: Homeowner	0.629	0.639	0.690	0.499	0.634
Dummy: Elementary education	0.125	0.090	0.070	0.200	0.108
Dummy: High school education	0.316	0.297	0.307	0.306	0.307
Dummy: Some college education	0.298	0.333	0.322	0.300	0.315
Dummy: College or more education	0.261	0.279	0.301	0.194	0.270
Dummy: Employed	0.951	0.956	0.964	0.927	0.953
Dummy: Married	0.575	0.531	0.580	0.488	0.553

Appendix: Data and Summary Statistics (Cont'd)

Mean value	Men	Women	White	Minority	Total
<i>Panel B: Economic conditions</i>					
Monthly income	3,990.432	2,767.036	3,660.407	2,748.021	3,391.666
Total personal debt	58,715	48,280	63,461	37,345	53,328
Secured business debt	414,133	126,348	318,435	128,793	263,390
Business equity	49,150	15,510	42,536	14,826	31,785
Net wealth	183,115	114,503	189,324	82,029	147,696
<i>Number of unique individuals</i>	166,859	159,950	230,548	96,261	326,809
<i>Percentage</i>	51%	49%	71%	29%	100%
<i>Panel C: Firm characteristics</i>					
Size dummy: Under 25 employees	0.950	0.966	0.952	0.968	0.955
Size dummy: 25-99 employees	0.037	0.024	0.035	0.023	0.033
Size dummy: No less than 100 employees	0.013	0.010	0.013	0.009	0.012
Monthly Profit amount	6,735.351	4,080.202	5,942.932	5,151.789	5,785.223
<i>Number of unique entrepreneurs</i>	26,385	14,703	32,898	8,190	41,088
<i>Percentage</i>	64%	36%	80%	20%	100%

◀ Go back

Appendix: Robustness tests

<i>Dep.</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>Var</i> =Entrepreneur						
	Include industry-state-time FE	Include family FE	Drop financial crisis period	Logit model	WLS model	Placebo test
Deregulation x Female	0.003** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.009** (0.003)	0.003*** (0.001)	-0.002 (0.002)
Deregulation x Minority	0.002* (0.001)	- -	0.004*** (0.001)	0.005** (0.002)	0.008*** (0.001)	0.002 (0.002)
Control	Yes	Yes	Yes	Yes	Yes	Yes
N	169,458	325,500	285,830	325,500	325,500	325,500
Sample Mean	0.050	0.050	0.050	0.050	0.050	0.050

◀ Go back

Appendix: Analysis of Potential Reverse Causality

	(1)	(2)
<i>Dep. Var</i> = Time to Deregulation		
Female Ratio	-0.004 (-0.32)	-0.002 (-0.17)
Minority Ratio	-0.028 (-1.33)	-0.022 (-0.99)
Entrepreneur Ratio		0.043 (1.61)
Female Entrepreneur Ratio		0.001 (0.03)
Minority Entrepreneur Ratio		-0.054 (-0.75)
State FE	Yes	Yes
Time FE	Yes	Yes
N	15,288	15,288
R ²	0.742	0.742

- Do not find evidence showing bank deregulation is more likely to be implemented when the gender or racial gap is large or low
- Not surprising since a large part of bank deregulatory changes is driven by the Dodd-Frank Act, whose time of implementation is totally determined by the federal government as a response to financial crisis and thus beyond the control of a single state government

The Effect of Deregulation on Racial Gaps in Startup Capital around the Transition into Entrepreneurs

<i>Dep. Var</i> =Log(1+debt _{t+1})-Log(1+debt _t)	(1)	(2)	(3)	(4)
	Secured business debt	Mortgage debt	Vehicle debt	Credit card debt
Minority x New Entrepreneur	-0.663*** (0.151)	-0.340** (0.149)	0.129 (0.155)	0.008 (0.313)
Minority x New Entrepreneur x Deregulation Index	0.115* (0.068)	0.109* (0.064)	-0.028 (0.051)	0.005 (0.102)
Controls	Yes	Yes	Yes	Yes
N	282,443	289,454	289,454	289,454
R ²	0.422	0.237	0.294	0.165

- $\Delta \text{Log}(\text{Debt}_{i,s,t}) = \beta_1 \text{Minority}_i \times \text{New Entrepreneur}_{i,t} + \beta_2 \text{Dereg}_{s,t} \times \text{Minority}_i \times \text{New Entrepreneur}_{i,t} + \gamma_1 \text{Minority}_i + \gamma_2 \text{Dereg}_{s,t} \times \text{Minority}_i + \gamma_3 \text{New Entrepreneur}_{i,t} + \text{FEs} + \varepsilon_{i,s,t}$
- $\Delta \text{Log}(\text{Debt}_{i,s,t})$: Raised startup capital amount to support business when transition into entrepreneurs at time t
- $\text{New Entrepreneur}_{i,t}$: dummy equal to one if transition to be entrepreneurs at time t
- Bank deregulation helps minority entrepreneurs raise more secured business debt and mortgage debt to reduce gaps in fundraising

The Effect of Deregulation on Gender Gaps in Startup Capital around the Transition into Entrepreneurs

<i>Dep. Var</i> =Log(1+debt _{t+1})-Log(1+debt _t)	(1)	(2)	(3)	(4)
	Secured business debt	Mortgage debt	Vehicle debt	Credit card debt
Female x New Entrepreneur	-1.447*** (0.180)	-0.382** (0.146)	-0.157 (0.097)	0.125 (0.245)
Female x New Entrepreneur x Deregulation Index	0.187*** (0.069)	0.127** (0.058)	0.082** (0.035)	0.005 (0.089)
Controls	Yes	Yes	Yes	Yes
N	282,443	289,454	289,454	289,454
R ²	0.425	0.237	0.294	0.165

- $\Delta \text{Log}(\text{Debt}_{i,s,t}) = \beta_1 \text{Female}_i \times \text{New Entrepreneur}_{i,t} + \beta_2 \text{Dereg}_{s,t} \times \text{Female}_i \times \text{New Entrepreneur}_{i,t} + \gamma_1 \text{Female}_i + \gamma_2 \text{Dereg}_{s,t} \times \text{Female}_i + \gamma_3 \text{New Entrepreneur}_{i,t} + \text{FEs} + \varepsilon_{i,s,t}$
- $\Delta \text{Log}(\text{Debt}_{i,s,t})$: Raised startup capital amount to support business when transition into entrepreneurs at time t
- $\text{New Entrepreneur}_{i,t}$: dummy equal to one if transition to be entrepreneurs at time t
- Bank deregulation helps female entrepreneurs raise more secured business debt and mortgage debt to reduce gaps in fundraising

Appendix: The Effect of Bank Deregulation on Firm Type

<i>Dep. Var</i> = Entrepreneur of different types of firms	(1) Big Firm (Employee \geq 25)	(2) Small Firm (Employee $<$ 25)	(3) Profitable Firm	(4) Unprofitable Firm
Deregulation Index x Female	0.001 ^{***} (0.000)	0.001 ^{**} (0.001)	0.003 ^{***} (0.001)	0.000 (0.000)
Deregulation Index x Minority	0.001 [*] (0.001)	0.001 (0.001)	0.004 ^{***} (0.001)	0.000 (0.000)
Female	-0.008 ^{***} (0.001)	-0.026 ^{***} (0.002)	-0.029 ^{***} (0.002)	-0.000 (0.000)
Minority	-0.007 ^{***} (0.002)	-0.012 ^{***} (0.002)	-0.020 ^{***} (0.002)	-0.000 (0.000)
Control	Yes	Yes	Yes	Yes
N	182,959	182,959	328,654	328,654
R ²	0.037	0.041	0.044	0.031
Sample Mean	0.02	0.04	0.05	0.01

- Decompose dependent variable into two subcomponents based on firm type
- This effect is more pronounced in big firm formation and positive profit firm formation
- Bank deregulation removes the barrier to entry without worsening the quality of new firms