

Fintech and Racial Barriers in Small Business Lending

Celine Yue Fei Keer Yang

Kenan-Flagler Business School, University of North Carolina at Chapel Hill

Carlson School of Management, University of Minnesota

December 3, 2021

Racial Disparities and Fintech Lending

- Racial disparities in small business lending in U.S.
 - Use personal funds as the primary funding source; approval for all the financing they applied. (Fed survey 2019)
 - Cannot find a lender for the application, missed deadline in the Paycheck Protection Program (Fed survey 2021).
- By automating the lending procedure, and reducing human interaction, fintech lenders can reduce racial barriers.

This Paper

Are there racial barriers in the traditional loan distribution channel?

- Fintech borrowers v.s. Traditional borrowers in the PPP.

Findings

- Firm-level: minority-owned businesses (+) use fintech lenders.
- How to understand this phenomenon?
 - The existence of racial barriers
$$OP_{fintech,m} - OP_{fintech,n} < OP_{bank,m} - OP_{bank,n}$$
 - In a two-sided matching model: the matching value of minority borrowers is higher with fintech lenders.
 - The convenience of fintechs (Berg, Fuster, and Puri (2021)) makes them more accessible for minorities.
 - Other explanations: lending relationships (Y); rating-based self-selection (N).

What the PPP setting rules out

- Loan terms – fixed by the SBA; the entry of fintechs – exogenously driven by the pandemic.
- All small businesses are hit by the Covid-19 shock almost simultaneously, application started on the same day.
- The credit risk – fully transferred to the government.

Literature

- **PPP**: Fairlie and Fossen (2021), Erel and Liebersohn (2020), Chernenko and Scharfstein (2021), Howell et. al. (2021) ...
- **Fintech and Racial Biases**: Bartlett et. al. (2021), Fuster et. al. (2021), D'Acunto et. al. (2020) ...
- **Fintech in SBL**: Mills and McCarthy (2016), Gopal and Schnabl (2020), Beaumont et. al. (2021) ...
- **Racial Disparities in SBL**: Bates (1997), ...

Data

- **PPP**: loan-level outcome info, sba.gov, 2021-March release, first-draw, both the 2020 and 2021 waves.
 - 372,541 borrowers – *Food Services and Drinking Places*.
 - Borrower legal name, location, employment size...
 - Lender legal name.
- **Yelp**: restaurant characteristics; ratings; minority ownership
 - [More](#) [Yelp v.s. PPP](#)
 - Algorithm-based, manual corrections, both the address and the business name, 28.01% are linked. [Linked v.s. Non-linked Sample](#)
- **Fintech Lenders**: *Fintech Companies Participating in PPP* on sba.gov, plus other lists. [More](#)
- **Other Data Sources**: FFIEC (lender classifications), SBA 7(a) and 504 loan-level data during 2009-2019 for lending relationships, HUD USPS zip code (correct city info. in the PPP).

Minority-Owned Businesses More Likely to Use Fintechs

$$I(\text{Fintech})_i = \beta I(\text{MinorityGroup})_i + \gamma X_i + \mu_{\text{city}} + \epsilon_i$$

2020 PPP 2021 PPP

Var. Sample	$I(\text{Fintech}) \times 100$			
	Full Sample		Matched Sample	
	(1)	(2)	(3)	(4)
$I(\text{Black})$	8.00*** (1.59)	4.99*** (1.67)	7.64*** (1.64)	4.86*** (1.71)
$I(\text{Asian})$	7.43*** (0.38)	6.07*** (0.40)	7.08*** (0.38)	5.84*** (0.40)
$I(\text{Hispanic})$	0.88*** (0.32)	0.06 (0.32)	0.82** (0.32)	0.04 (0.33)
Employment	-0.06*** (0.00)	-0.06*** (0.00)	-0.14*** (0.01)	-0.14*** (0.01)
City FEs		X		X
Observations	92,556	88,873	86,095	82,426

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Controls for $I(\text{Franchise})$ and Business Type.
Matched sample: match minorities with non-minorities using covariates.

- Consistent with Erel and Liebersohn (2020); Howell et. al. (2021).
- Magnitude: sample mean (9%-10%).

A Simple Borrower-Lender Matching Model

- A two-sided matching model (transferable utility)
- Competitive Equilibrium: any deviation from either the borrower side or the lender side cannot achieve a higher payoff.
- Payoff function $p_{i,j}(\gamma_i, \theta_{i,j})$
 - γ_i – rating of the borrower i .
 - $\theta_{i,j}$ – lender-borrower specific valuation.
- Channels for minorities using fintechs more
 - A difference in the minority-non-minority rating gap between fintechs and banks can only arise when $\theta_{i,j}$ is racial dependent.
 - Racial disparities in lending relationships.
 - Self-selection of higher-rated borrowers.

Uneven Inclusion Across Racial Groups

$$Rating_{i,t} = \beta I(\text{Black}) \times I(\text{Fintech})_i + \gamma X_i + \mu_{\text{city},t} + \epsilon_{i,t}$$

2020 PPP 2021 PPP

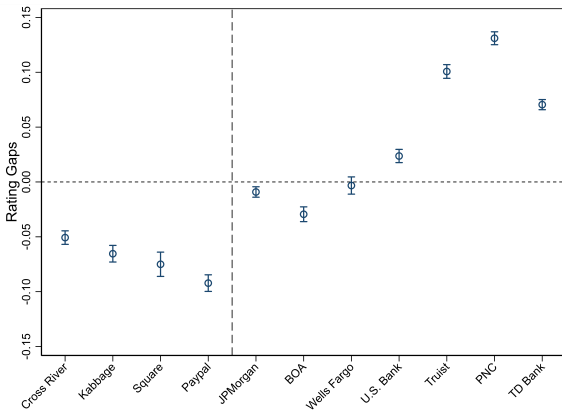
Var. Sample	Rating Starts			
	Full		Matched	
	(1)	(2)	(3)	(4)
$I(\text{Black}) \times I(\text{Fintech})$	-0.25** (0.11)	-0.23** (0.11)	-0.24** (0.11)	-0.23** (0.11)
$I(\text{Asian}) \times I(\text{Fintech})$	-0.06*** (0.02)	-0.04* (0.02)	-0.06*** (0.02)	-0.04* (0.02)
$I(\text{Hispanic}) \times I(\text{Fintech})$	-0.02 (0.03)	0.00 (0.03)	-0.02 (0.03)	-0.01 (0.03)
Monthly FEs	X		X	
City×Monthly FEs		X		X
Observations	464,639	434,948	432,598	403,363

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Controls: $I(\text{Fintech})$, $I(\text{Black})$, $I(\text{Asian})$, $I(\text{Hispanic})$, Employment, $I(\text{Franchise})$, City×Monthly FEs, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating.

- Negative sign – lower racial barriers with fintech lenders.
- Insignificant for Black- and Asian-owned in 2021.
- Really racial barriers! Can rule out first-difference stories.

Big v.s. Small Banks

Figure: 2020, Pre-Covid Ratings (Asian-owned) 2021



- Insignificant for top-4 banks
- Significantly positive for smaller banks.

Both supply and demand sides matter!

- Borrower business capital \uparrow , rating gap \downarrow – soft assets. Result
- Lender geographic focus \downarrow , rating gap \downarrow – soft info. Result

Other Tests

- Robustness checks
 - Other classifications: banks that participate in SBA programs for the first time, credit unions, CDFI/CDC, Non-federally-insured lenders, and S&LAs. Result
 - Approval dates: minority borrowers using fintechs got the loan approval earlier? (N), controlling for approval date FE. Result
 - Ratings before the Covid-19 crisis.
- Other Explanations
 - Lending Relationships: Yes. (Measure: SBA loans 2009-2019). Minority-owned businesses (−) lending relationships. Result
Businesses without lending relationships (+) fintechs. Result
 - Rating-Based Self-Selection: Unlikely. Minority-owned businesses are of lower ratings. But higher-rated businesses use fintechs. Result

Conclusions

- On the firm-level, a national-wide sample of restaurants, minority borrowers are more likely to use fintech lenders.
- Novel evidence on the existence of a racial gap in terms of operational performance.
- Future studies
 - Further evidence for taste-based discrimination of lenders and borrower approaching difficulties (language, culture,..)
 - Do fintech lenders improve firm productivity for minority-owned businesses by extending the credit constraint?

Thank You!

Celine.Fei@kenan-flagler.unc.edu, yang5427@umn.edu

Compare Linked v.s. Non-linked Sample

	UnLinked	Linked
Current Approval Amount	102,801	77,030
Approved Date	06/27/2020	05/19/2020
Jobs Reported	21	18
Franchise	7.4%	12.1%
Corporation	29.2%	33.9%
L.L.C.	35.8%	38.8%
Partnership	2.4%	3.0%
S Corporation	11.6%	14.0%
Sole Proprietorship	15.9%	9.4%
Self Employed	3.0%	0.6%

[back](#)

Minority-Owned Businesses

- A key data challenge: in the PPP, around 80% of the sample does not have demographic info.
- Other papers
 - Zip-code/county level analysis (Erel and Liebersohn (2020); Fairlie and Fossen (2021)).
 - Predictions from the machine-learning algorithm using location and borrower name (Howell et. al. (2021)).
 - Links to Florida restaurant registry data (Chernenko and Scharfstein (2021)).
- Our paper: use the food type info. from Yelp as a proxy.
 - Covers all the 50 states and D.C. across the U.S.
 - Borrower level (instead of region level).
 - Do not use geo. info. to build the metrics.

Minority Measure: Yelp vs PPP Data (1/2)

Overall, the minority measure based on Yelp works well.

Cross Shares

PPP	Yelp				
	White	Non-White	Hispanic	African Ame.	Asian
White	74.9%	12.2%	26.9%	12.0%	4.7%
Non-White	25.1%	87.8%	73.1%	88.0%	95.3%
Hispanic	3.9%	18.3%	51.9%	1.8%	1.8%
African Ame.	4.0%	5.2%	7.5%	80.1%	0.5%
Asian	13.7%	59.5%	5.9%	1.8%	89.6%
Native American	3.5%	4.8%	7.8%	4.2%	3.4%
Observations	13,327	5,498	1,806	166	3,526

The reversed cross share table in the paper. [back](#)

Minority Measure: Yelp vs PPP Data (2/2)

Pairwise Correlation

	Minority Yelp	African Yelp	Asian Yelp	Hispanic Yelp
Minority PPP	0.58*** (0.00)			
African PPP		0.35*** (0.00)		
Asian PPP			0.52*** (0.00)	
Hispanic PPP				0.68*** (0.00)
Observations	18,825			

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

back

Fintech PPP Lenders

- Classification of Fintech Lenders
 - sba.gov: Fintech Companies Participating in PPP.
 - Local SBA websites: AZ, MD, NC, Orange county (CA).
 - Other lists: Lend Academy; Medium; USChamber.
 - Manually check all other non-banks: no clear fintech companies.
- Examples: Kabbage, Square, Ondeck, Paypal, ...15 in total.
- Fintech loan account for around 15.69% in the PPP.
 - 13.30% for the restaurant sample.

Minority-Owned Businesses More Likely to Use Fintechs

- Large magnitude in 2021 in absolute terms.
- Similar to 2020 when compared to sample mean (17%-18%).

2021 PPP [back](#)

Var. Sample	$I(\text{Fintech}) \times 100$			
	Full Sample		Matched Sample	
	(1)	(2)	(3)	(4)
$I(\text{Black})$	16.18*** (5.05)	5.52 (6.08)	16.07*** (5.07)	6.62 (6.01)
$I(\text{Asian})$	10.14*** (1.33)	6.10*** (1.80)	9.60*** (1.34)	5.67*** (1.82)
$I(\text{Hispanic})$	4.95*** (1.42)	3.31* (1.93)	5.04*** (1.44)	3.71* (1.98)
Employment	-0.14*** (0.03)	-0.12*** (0.05)	-0.26*** (0.05)	-0.30*** (0.07)
$I(\text{Franchise})$	-2.95* (1.78)	-7.72*** (2.74)	-2.42 (1.88)	-6.90** (2.85)
City FEs		X		X
Business Type FEs	X	X	X	X
Observations	6,266	4,150	6,022	3,984
Adjusted R^2	0.061	0.078	0.061	0.084

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

Uneven Inclusion Across Racial Groups

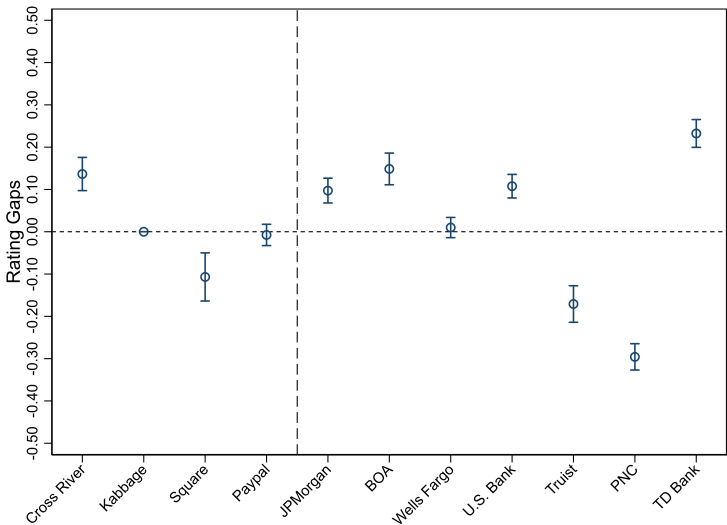
2021 PPP [back](#)

Var. Sample	Rating Starts			
	Full		Matched	
	(1)	(2)	(3)	(4)
$I(\text{Black}) \times I(\text{Fintech})$	-0.14 (0.18)	-0.29 (0.21)	-0.12 (0.18)	-0.26 (0.21)
$I(\text{Asian}) \times I(\text{Fintech})$	-0.02 (0.07)	0.01 (0.10)	-0.00 (0.07)	0.03 (0.10)
$I(\text{Hisp.}) \times I(\text{Fintech})$	-0.18** (0.09)	-0.28** (0.13)	-0.19** (0.09)	-0.27** (0.13)
Monthly FEs	X		X	
City \times Monthly FEs		X		X
Observations	26,491	14,723	25,476	14,095

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Controls: $I(\text{Fintech})$, $I(\text{Black})$, $I(\text{Asian})$, $I(\text{Hispanic})$, Employment, $I(\text{Franchise})$, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating.

Big v.s. Small Banks

Figure: 2021, Pre-Covid Ratings (Asian-owned)



Borrower Business Capital

- Proxy business capital by the number of ratings.

Var. Sample	Rating Starts			
	2020 PPP		2021 PPP	
	Pre-Covid	During-Covid	Pre-Covid	During-Covid
	(1)	(2)	(3)	(4)
$I(\text{Afri.}) \times I(\text{FT}) \times \text{BC}$	0.07* (0.04)	0.03 (0.11)	-0.07 (0.12)	0.04 (0.12)
$I(\text{Asia.}) \times I(\text{FT}) \times \text{BC}$	0.10*** (0.01)	0.07*** (0.01)	0.28*** (0.05)	0.17*** (0.05)
$I(\text{Hisp.}) \times I(\text{FT}) \times \text{BC}$	0.12*** (0.02)	0.08*** (0.02)	-0.00 (0.09)	-0.18 (0.11)
Observations	902,934	403,363	28,211	14,095

Matched sample results here. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: $I(\text{Fintech})$, Racial group dummies, Employment, $I(\text{Franchise})$, $\text{City} \times \text{Monthly FEs}$, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating.

Lender Geographic Focus

- Proxy lender attention by the relative geographic lending scope (N_{zip}/N_{city}).

Var. Sample	Rating Starts			
	2020 PPP		2021 PPP	
	Pre-Covid	During-Covid	Pre-Covid	During-Covid
	(1)	(2)	(3)	(4)
$I(\text{Afri.}) \times I(\text{FT}) \times GS_{\frac{zip}{city}}$	-0.06 (0.05)	-0.15** (0.07)	-0.21 (0.14)	-0.17 (0.15)
$I(\text{Asian}) \times I(\text{FT}) \times GS_{\frac{zip}{city}}$	-0.06*** (0.01)	-0.03** (0.01)	0.06 (0.06)	0.02 (0.06)
$I(\text{Hispanic}) \times I(\text{FT}) \times GS_{\frac{zip}{city}}$	0.01 (0.02)	-0.00 (0.02)	0.06 (0.07)	-0.18** (0.09)
Observations	896,408	400,262	27,632	13,745

Matched sample results here. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: $I(\text{Fintech})$, Racial group dummies, Employment, $I(\text{Franchise})$, City \times Monthly FEs, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating.

First-Time Banks – Usage Rate

Var. Sample	$I(\text{New Bank}) \times 100$			
	2020		2021	
	Full	Matched	Full	Matched
	(1)	(2)	(3)	(4)
$I(\text{African Ame.})$	0.20 (0.93)	0.44 (0.96)	7.54 (7.76)	7.36 (7.87)
$I(\text{Asian})$	-1.40*** (0.21)	-1.39*** (0.21)	-1.82** (0.79)	-1.84** (0.83)
$I(\text{Hispanic})$	-0.12 (0.24)	-0.17 (0.25)	1.98 (1.53)	2.09 (1.58)
Employment	-0.01*** (0.00)	0.00 (0.00)	-0.01 (0.02)	-0.02 (0.04)
$I(\text{Franchise})$	-0.07 (0.27)	-0.09 (0.30)	0.77 (1.67)	0.60 (1.78)
Observations	78,589	72,390	2,950	2,815

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: City FEs, Business Type FEs.

First-Time Banks – Rating Gap

Var. Sample	Rating Starts			
	2020		2021	
	Pre-Covid	During-Covid	Pre-Covid	During-Covid
	(1)	(2)	(3)	(4)
$I(\text{Afri.}) \times I(\text{New Bank})$	-0.07 (0.16)	0.05 (0.19)	0.42* (0.24)	0.31 (0.31)
$I(\text{Asian}) \times I(\text{New Bank})$	-0.02 (0.04)	-0.02 (0.05)	0.18 (0.30)	0.07 (0.37)
$I(\text{Hisp.}) \times I(\text{New Bank})$	0.01 (0.04)	0.01 (0.05)	-0.27 (0.22)	-0.37 (0.33)
$I(\text{New Bank})$	0.03 (0.02)	0.01 (0.02)	0.13 (0.17)	0.27* (0.14)
Observations				

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: Employment, $I(\text{Franchise})$, $\text{City} \times \text{Monthly FEs}$, Business Type FEs, Eating Policy Controls.

Approval Speed

Var. Sample	$\Delta(\text{Approval Date}-\text{PPP Starting Date})$			
	2020		2021	
	Full (1)	Matched (2)	Full (3)	Matched (4)
$I(\text{Afri.}) \times I(\text{Fintech})$	-2.20 (3.25)	-2.01 (3.26)	-0.01 (4.65)	-0.04 (4.69)
$I(\text{Asian}) \times I(\text{Fintech})$	3.11*** (0.76)	3.39*** (0.77)	-7.34*** (2.16)	-7.54*** (2.17)
$I(\text{Hispanic}) \times I(\text{Fintech})$	0.06 (1.15)	0.11 (1.15)	-6.71** (2.64)	-6.83** (2.68)
$I(\text{Fintech})$	11.93*** (0.52)	11.27*** (0.52)	0.66 (1.28)	0.50 (1.30)
$I(\text{African Ame.})$	7.61*** (1.29)	6.86*** (1.29)	4.35 (2.98)	4.56 (3.06)
$I(\text{Asian})$	9.08*** (0.33)	8.47*** (0.33)	1.42 (1.09)	1.28 (1.10)
$I(\text{Hispanic})$	4.98*** (0.28)	4.84*** (0.29)	2.51* (1.30)	2.50* (1.33)
Observations	88,873	82,426	4,150	3,984

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: City FEs, Business Type FEs.

- Restricted to after the entry of fintech lenders – even stronger!

Controlling for Approval Date FE

2020 PPP

Var. Sample	Rating Starts			
	Pre-Covid		During-Covid	
	Full	Matched	Full	Matched
	(1)	(2)	(3)	(4)
$I(\text{Black}) \times I(\text{Fintech})$	-0.09 (0.08)	-0.08 (0.08)	-0.23** (0.11)	-0.23** (0.11)
$I(\text{Asian}) \times I(\text{Fintech})$	-0.08*** (0.02)	-0.08*** (0.02)	-0.04 (0.02)	-0.04* (0.02)
$I(\text{Hispanic}) \times I(\text{Fintech})$	0.01 (0.03)	0.01 (0.03)	0.01 (0.03)	-0.00 (0.03)
Observations	974,781	902,934	434,947	403,362

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Controls: $I(\text{Fintech})$, $I(\text{Black})$, $I(\text{Asian})$, $I(\text{Hispanic})$, Employment, $I(\text{Franchise})$, City \times Monthly FEs, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating, approval date FE.

Controlling for Approval Date FE

2021 PPP

Var. Sample	Rating Starts			
	Pre-Covid		During-Covid	
	Full	Matched	Full	Matched
	(1)	(2)	(3)	(4)
$I(\text{Black}) \times I(\text{Fintech})$	-0.32 (0.21)	-0.35 (0.21)	-0.25 (0.21)	-0.27 (0.22)
$I(\text{Asian}) \times I(\text{Fintech})$	0.08 (0.09)	0.09 (0.09)	0.02 (0.10)	0.05 (0.10)
$I(\text{Hispanic}) \times I(\text{Fintech})$	0.11 (0.11)	0.10 (0.11)	-0.28** (0.13)	-0.28** (0.13)
Observations	50102	28211	25476	14093

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Controls: $I(\text{Fintech})$, $I(\text{Black})$, $I(\text{Asian})$, $I(\text{Hispanic})$, Employment, $I(\text{Franchise})$, City \times Monthly FEs, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating, approval date FE.

Minority-Owned Businesses and Lending Relationships

Var. Sample	I(Rel.)×100		N. Loans×100	
	2020		2021	
	(1)	(2)	(3)	(4)
I(African Ame.)	-0.87 (0.68)	-1.20 (1.13)	1.89 (2.35)	1.59 (2.39)
I(Asian)	-1.00*** (0.18)	-1.42*** (0.26)	-0.07 (0.57)	-0.06 (0.65)
I(Hispanic)	-1.03*** (0.17)	-1.40*** (0.21)	-0.02 (0.67)	0.02 (0.79)
Employment	2.11*** (0.45)	3.21*** (0.61)	4.95 (3.34)	5.63 (4.36)
I(Franchise)	3.83*** (0.31)	3.98*** (0.41)	1.61 (1.25)	2.27 (1.67)
Observations	82,426	82,426	3,984	3,984

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: City FEs, Business Type FEs.

Lending Relationships and Using Fintechs

Var.	$I(\text{Fintech}) \times 100$			
	2020		2021	
Sample	(1)	(2)	(3)	(4)
$I(\text{Rel.})$	5.31*** (0.53)	-10.38*** (1.97)		
N. Loans	(0.43)	(1.62)	-3.34***	-8.26***
Employment	-0.15*** (0.01)	-0.15*** (0.01)	-0.31*** (0.07)	-0.31*** (0.07)
$I(\text{Franchise})$	-1.10*** (0.36)	-1.17*** (0.36)	-8.26*** (2.81)	-8.24*** (2.82)
Observations	82,426	82,426	3,984	3,984

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Other controls: City FEs, Business Type FEs.

Minority-Owned, Fintechs, and Ratings

Var. Sample	Rating Starts			
	2020 PPP		2021 PPP	
	Full (1)	Matched (2)	Full (3)	Matched (4)
I(Fintech)	0.02*** (0.01)		-0.04 (0.04)	
I(Minority)		-0.07*** (0.00)	-0.08*** (0.03)	
Employment	-0.11*** (0.01)	-0.12*** (0.01)	-0.34** (0.15)	-0.36** (0.15)
I(Franchise)	-0.89*** (0.01)	-0.91*** (0.01)	-0.81*** (0.07)	-0.83*** (0.07)
Observations	1,409,729	1,409,729	43,981	43,981

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Controls: $I(\text{Fintech})$, $I(\text{Black})$, $I(\text{Asian})$, $I(\text{Hispanic})$, Employment, $I(\text{Franchise})$, City \times Monthly FEs, Business Type FEs, Dummies for delivery, takeout, reservations, and outdoor seating, approval date FE.