Funding Black High-Growth Startups

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Diversity (lack of) in high-growth startups has implications for the racial wealth gap

- Broad participation in innovation benefits the *entire* economy (Hsieh et al (2019))
  - 20% and 40% of growth in aggregate market output per person can be explained by the improved allocation of talent; Zero barriers will raise GDP by another 10%.
- Persistent racial gaps in wealth might be addressed via entrepreneurship (Chetty et. al (2020); Quadrinin (2020))
- *High-growth* entrepreneurship, which sometimes involves venture capital firms, could play a key role
  - Exits of high-growth firms via initial public offerings or acquisitions create substantial wealth ($305 million on average in our sample)
- Our knowledge of race and entrepreneurship focuses on small businesses or small samples (Blanchflower et al. (2003), Fairlie et al. (2022))

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What is the role of race in funding opportunities?

What role does race play in funding opportunities for high-growth startups?

How large is the funding gap?

Why does race (not) play a role?

- To what extent is race related to the funding gap because of omitted founder/startup characteristics?
- To what extent is the association, if any, between race and funding opportunities the result of bias/statistical discrimination?

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What do we find?

Black startups raise less than half funding of non-Black startups

1. **1/3 of the gap**: 1) Number of founders 2) Network 3) Location 4) Patents
2. Using patent applications/citations as a (very rough) proxy for idea quality, we are not able to find a difference in approvals/citations
3. We are not able to find a gap in angel, equity or product crowdfunding, accelerator, or grant funding.
4. Funding gap persists even after reasonable assumptions of the influence of omitted variables
5. No difference in acquisition/IPO rates (inconsistent with taste-based bias)
6. Evidence is also consistent with biased beliefs and segregated networks
    1. Funding gap reverses at later stages of funding
    2. Investor heterogeneity in who funds Black high-growth startups suggests networks (screening expertise) are likely important (Cornell and Welch (1996))

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How do we identify Black founders of high-growth startups?

We combine image and name-processing algorithms with clerical review to predict race for (~150,000 founders/lead Partners)

P Black: 100%

Ravi Ada

P Asian N: 0.997

P Black: 100%

Austin Rolling

P Asian N: 0.007

Commercial databases do not systematically classify founders by ethnicity

1. We use the pre-trained model(s) to identify Black founders (using images from various web sources)
    1. Clerical review of all founders classified as Black (DeepFace Black probability greater than 50% but high (50% of more) likelihood of being Asian)
    2. Clerical review of all founders classified as non-Black (DeepFace Black probability less than 50% but Name Prism Black probability of 50% or more)
        - Affinity groups in LinkedIn (Nigerian Leadership Initiative), news reports, crowd-sourced lists of Black founders, attendance at an HBCU
2. For each startup, we calculate the proportion of founders that are Black
3. ***UNIT OF OBSERVATION***: U.S.-based startup in PitchBook where we could found images for at least one founder; We will only keep founders with images and track fundraising activity following company formation

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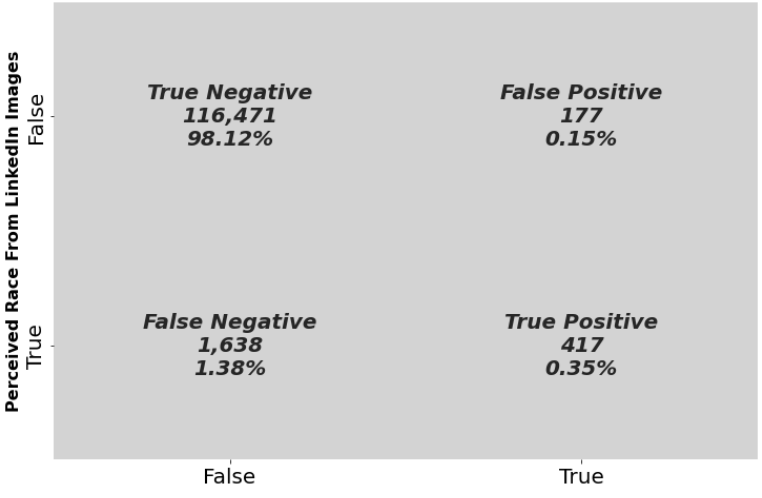
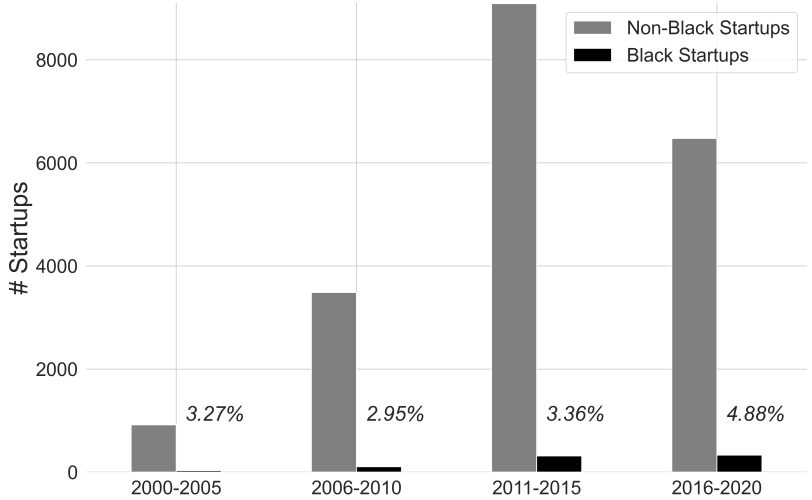
PitchBook Data: Name classification algorithms are not enough — large Type II error rates



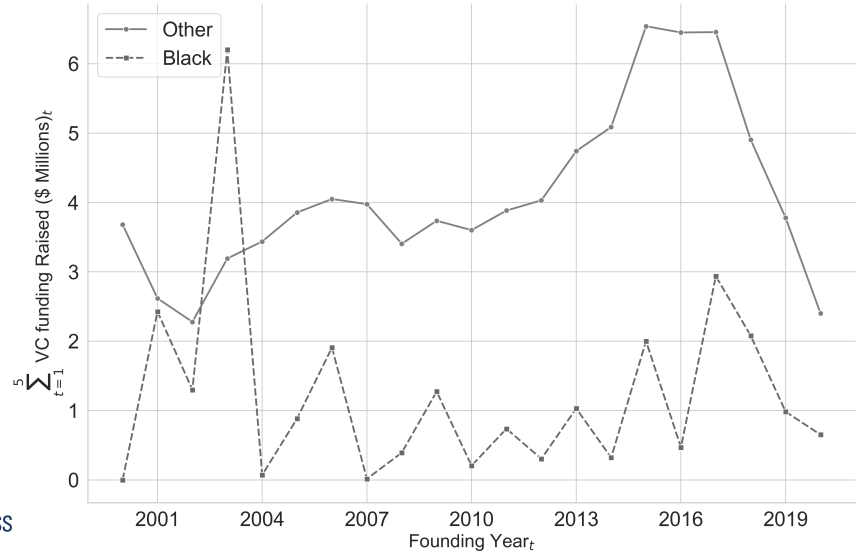
Results

Representation of Black high-growth startups is low



MICHIGAN ROSS

Black startups raise $ 3 million less VC funding in the five years following company formation



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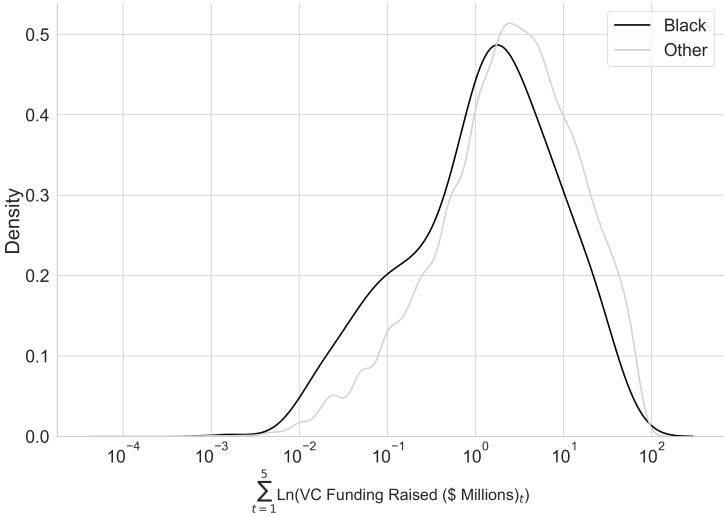
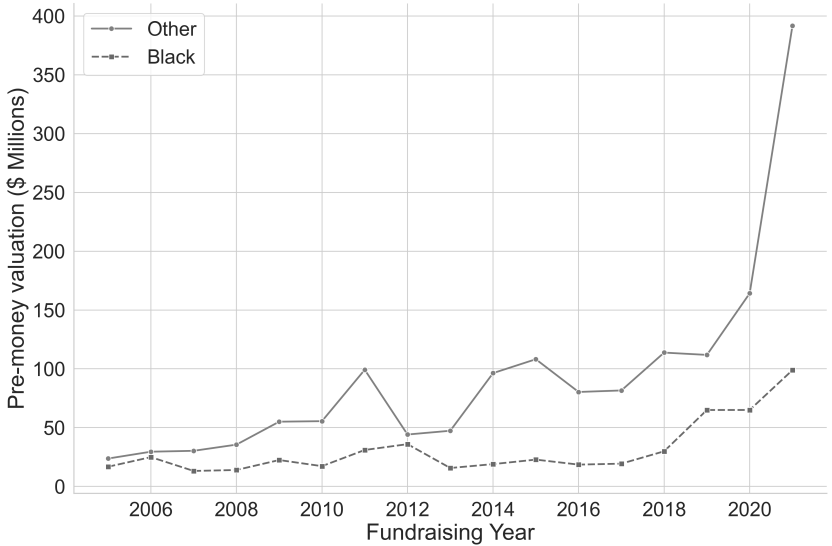
The funding gap is not driven by outliers



Black startups also have lower pre-money valuations



MICHIGAN ROSS

We estimate the funding gap using Poisson regressions

$$\text{VC Funding}_{ct} = \exp^{\beta_1 \text{P(Black)}_c + \textit{Controls} + \epsilon_c}$$

Startup c, 2, 3, 4, 5 years (t) following company formation

Hypothesis: β_1 <0: There is a funding gap in VC funding for startups with Black founders

Interpretation: Startups with all Black founders raise $(100 \times (e^{\beta_1} - 1))$ less funding relative to startups with no Black founders

Controls: P(Female), P(Serial Founder), P(Top School), Network Score, I(Has Patent), Ln(Count Founders), State X Year X Industry FE

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Black startups raise 55-57% less VC funding relative to other startups in the same state-industry-year

Dependent Variable:	VC Funding			
	Next 2yrs?	Next 3yrs?	Next 4yrs?	Next 5yrs?
P(Black)	-0.801***	-0.826***	-0.820***	-0.839***
	(0.153)	(0.144)	(0.145)	(0.155)
P(Female)	-0.597***	-0.623***	-0.590***	-0.610***
	(0.052)	(0.051)	(0.051)	(0.051)
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Empirical Strategy

Is the funding gap omitted variables (Om Var), bias, or Statistical Discrimination (Stat D.)?

$$\text{Ln(Total Funding)}_i = \alpha_1 + \beta_1 \text{P(Black)}_i + X'\gamma + \lambda_{jst} + \epsilon_i$$

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We fail to find Black startups are less likely to be have their patents granted/cited

Dependent Variable:	I(Granted)	Citations	Years to Grant
	(1)	(2)	(3)
P(Black)	-0.006	-0.530	-0.038
	(0.090)	(0.415)	(0.072)
P(Female)	-0.028	-0.056	-0.006
	(0.033)	(0.196)	(0.027)
Fixed Effects	USPC Class X Year	USPC Class X Year	USPC Class X Year

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On the intensive margin, the funding gap holds controlling for *Pre-money* valuation

Dependent Variable:	Ln(VC Funding)			
P(Black)	-0.587***	-0.205***	-0.204***	-0.210***
	(0.133)	(0.063)	(0.062)	(0.062)
Ln(Pre-money valuation)		0.833***	0.817***	0.809***
		(0.004)	(0.004)	(0.004)

There is no funding gap in other sources of equity funding (Demand)

Dependent Variable:	**Non-VC Funding**			
	Next 2yrs?	Next 3yrs?	Next 4yrs?	Next 5yrs?
P(Black)	0.136	0.130	0.057	0.047
	(0.103)	(0.108)	(0.110)	(0.114)
P(Female)	0.011	0.019	0.010	-0.021
	(0.052)	(0.052)	(0.052)	(0.053)

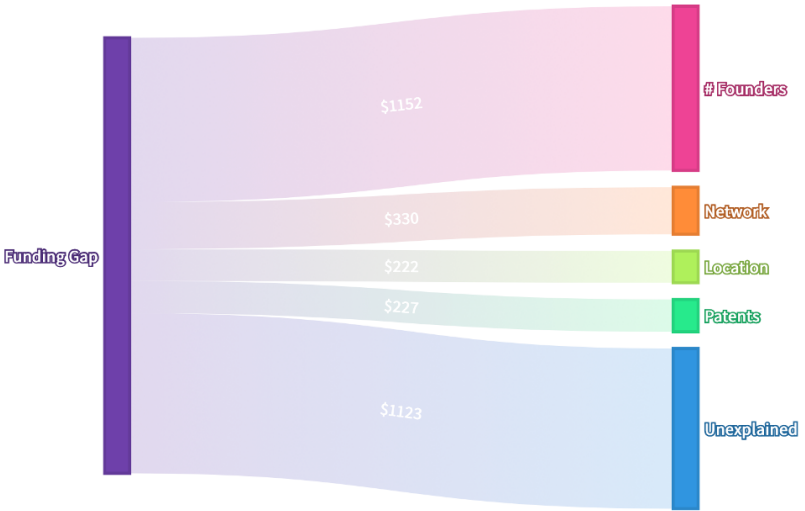
Funding gap is not related to racial animus in startups location

Dependent Variable:	VC Funding			
	Next 2yrs?	Next 3yrs?	Next 4yrs?	Next 5yrs?
I(Racial animus) X P(Black)	-0.164	-0.194	-0.059	0.030
	(0.337)	(0.313)	(0.312)	(0.335)
P(Black)	-0.625***	-0.641***	-0.691***	-0.744***
	(0.207)	(0.194)	(0.198)	(0.203)
I(Racial animus)	-0.404***	-0.417***	-0.423***	-0.422***
	(0.042)	(0.040)	(0.040)	(0.039)

Omitted variables would have to be 4X more important to explain away funding gap

	Panel A: ? Test (R_{max} = 1.3×0.288)			
	Baseline Effect (Std. error) [R^2]	Controlled Effect (Std. error) [R^2]	Identified Set	$\tilde{\delta}$ for β = 0 given R_{max}
P(Black)	-1.291*** (.107) [0.005]	-0.838*** (.103) [0.288]	[-1.291, -0.672]	4.209

The variables we fix explain over a third of the funding gap



Bias and/or Statistical Discrimination

Bias and statistical discrimination have different empirical implications

- ***Bias***
  - **"Taste-based:"** Becker (1993) — Better outcomes for the marginal Black-founded startup (they had to pass a higher threshold)
  - **Unconscious Bias**: Tversky and Kahneman (1974) — Anchoring/Confirmation bias/Representativeness (stereotypes)
  - **Biased-beliefs**: Bohren et. al (2019) — Evolution of discrimination can identify its underlying source (Over time, investors should adjust biased beliefs)
  - **Organizational (structural) bias**: Small and Pager (2020) — Referral-based investment practices may hurt Black founders more likely to be outside the partner's network (Lead partner's race would play a role)
- ***Statistical discrimination***: Black startups have worse outcomes

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Evidence weakly consistent with biased (initial) beliefs

Dependent Variable:	I(Early Stage)	I(Late Stage)	VC Funding (ES)	VC Funding (LS)
	(1)	(2)	(3)	(4)
P(Black)	-0.144***	-0.035	-0.854***	0.003
	(0.035)	(0.028)	(0.270)	(0.481)
P(Serial Founder)	0.027**	-0.003	0.257***	0.075
	(0.013)	(0.010)	(0.057)	(0.099)

Evidence weakly consistent with biased (initial) beliefs

Dependent Variable:	I(Early Stage)	I(Late Stage)	VC Funding (ES)	VC Funding (LS)
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Black partners are most likely to fund Black startups (Structural Bias)

Dependent Variable:	I(Invested in Black Founder)			
I(Black)	0.180***	0.179***	0.178***	0.178***
	(0.027)	(0.027)	(0.027)	(0.027)
I(Female)		0.019***	0.019***	0.019***
		(0.007)	(0.007)	(0.007)
I(Asian)			-0.009	-0.009
			(0.006)	(0.006)
I(Hispanic)				-0.005
				(0.013)

Black partners are most likely to fund *successful* Black startups (Cornell and Welch (1996))

Dependent Variable:	I(Successful Black Founder)			
I(Black)	0.046***	0.046***	0.045***	0.045***
	(0.015)	(0.015)	(0.015)	(0.015)
I(Asian)			-0.005	-0.005*
			(0.003)	(0.003)
I(Hispanic)				-0.008*
				(0.004)
I(Female)		-0.005**	-0.004**	-0.004**
		(0.002)	(0.002)	(0.002)

Conclusion

Conclusion: Equity funding gap for black inventors is concentrated in VC funding

- What is/explains the funding gap for Black founders among high-growth startups?
  - Black founders raise 55-57% less VC funding compared with non-Black founders
  - **1/3 of the gap**: 1) Number of founders 2) Network 3) Location 4) Patents
  - Cannot detect differences in patents grants/citations
- Funding gap reversal consistent with incorrect initial beliefs
- Networks (screening expertise) likely play an important role

Next Steps: What is the impact of these financial frictions on startup growth? Develop a tighter link between the gap and investor preferences.

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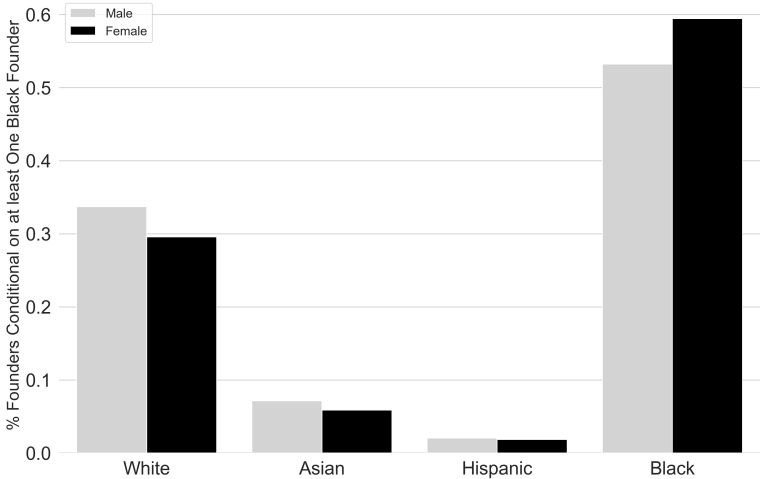
Black founders start companies with other Black founders



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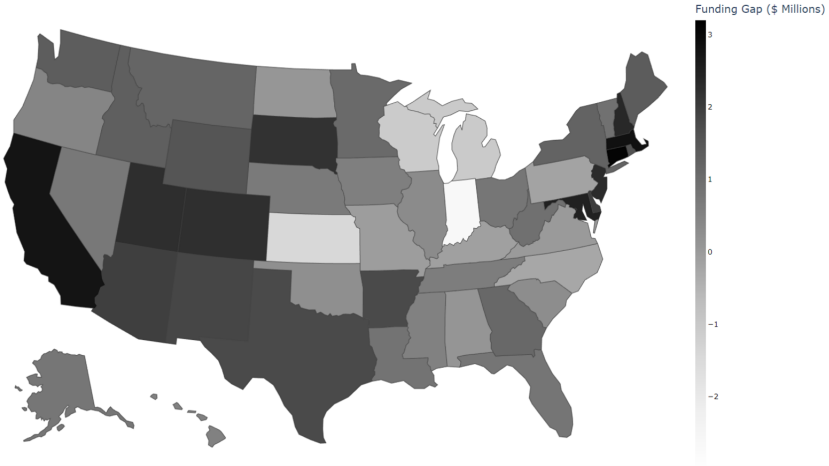
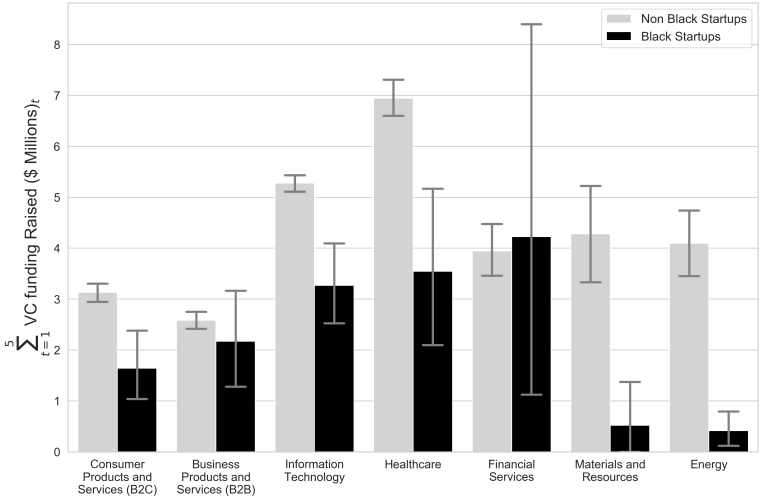
There is variation in the funding gap by State



There is variation in the funding gap by Industry



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The variables we fix explain over a third of the funding gap

	Blinder-Oaxaca Decomposition	
	Dollar Difference	Log(Difference)
Venture Funding (5 yrs)		
No Black Founder	4.462	0.961
Has Black Founder	1.111	-0.391
Difference	3.351	1.353
Explanatory components		
Ln(Count Founders)	1.152	0.232
Network Score	0.330	0.082
State X Year X Industry FE	0.222	0.066
P(Female)	0.097	0.028
P(Top School)	0.057	0.026
I(Has Patent)	0.227	0.034
P(Serial Founder)	0.141	0.012
Total explained (controls)	2.228	0.482