Self-Reporting Race in Small Business Loans: A Game-Theoretic Analysis of Evidence from PPP Loans in Durham, NC

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Recent research on racial self-identification has focused on modeling the choice of racial-ethnic identity, finding the key factors and incentives that influence the decision to identify as belonging to one racial-ethnic group or another (Darity, Mason and Stewart, 2006; Antman and Duncan, 2015). However, little is known about the effects of concealing racial information in high-stake situations such as when applying to college, for a mortgage, or business and personal loans.[1] We aim to help bridge this gap in the literature by investigating business ownership racial disclosure and its impact on funding.

Does concealing racial information in small business loan applications help or hurt business owners? Are these effects heterogeneous across racial-ethnic groups? If so, which group benefits the most from these practices? In this and our companion paper (Garcia et al., 2021) we study the answers to these questions.

We use data from the Small Business Administration (SBA)'s Paycheck Protection Program (PPP), one of the fiscal stimuli implemented by the U.S. government to help small businesses (those with 500 employees or fewer) during the COVID-19 pandemic in our empirical analysis. We claim that the disbursement of PPP loans presents a useful setting to analyze the implications of concealing racial identity in lending for various reasons. First, the federal PPP funds were fixed and limited.[2] Second, SBA used local financial institutions and organizations to help quickly disburse the funds on a first-come, first-served basis. Third, at least 60 percent of the proceeds needed to be spent on qualifying payroll costs and expenses, and the rest could be used for other operating expenses such as meeting mortgage interest, rent, and utility expenses. Lastly, PPP loans had a low-interest rate of one percent, and borrowers are eligible for full PPP loan forgiveness by SBA if the borrower maintains current employee and compensation levels for at least 8-24 weeks after funds disbursement.

One of the empirical challenges associated with our study is that racial self-identification is only known once it is formally reported in a survey or administrative dataset. Often, business owners do not self-report their race. For example, based on a national sample of PPP loans, 90% of borrowers do not report their race (Atkins, Cook and Seamans, 2021). We overcome this challenge by hand-collecting race information of PPP borrowers from different sources such as business owners themselves, black small business directories, company websites, government agencies, LinkedIn, Facebook, among other sources. The hand-collected data allows us to quantify the payoff of not self-reporting race relative to those that self-report their race in PPP loan applications. Given the volume of PPP loans, we focus on PPP loans allocated to business owners in Durham, NC, a diverse city and the historic site of an important

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[1]Examples of low-stakes settings for reporting race are filling out the US Census, surveys, driver's license applications, among others

[2]Public Law 116-147 authorized $659 billion to be allocated during the first PPP loan wave in 2020.

business district once referred to as a Black Wall Street.

This and our companion paper (Garcia et al., 2021) are the firsts to address these questions and to discover and match business owners' race and ethnicity to PPP borrowers who concealed this information.[3] Our research contributes to the growing literature on PPP loans and race, extending, in particular, the work of Atkins, Cook and Seamans (2021); Humphries, Neilson and Ulyssea (2020). It also contributes to the literature on racial biases in financial services and the banking system (Blanchflower, Levine and Zimmerman, 2003; Blanchard, Zhao and Yinger, 2008).

I. Conceptual Framework: A Race Reporting Dilemma

We use a game-theoretic conceptual framework to analyze the evidence from PPP loans in a southern city. We consider a static game with complete information to model the local small business loan market with a limited amount of funds to disburse to a large number of borrowers. The game consists of two types of borrowers (players), many identical lenders (intermediaries), and a regulator (enforcer or social planner).

Nature moves first and randomly distributes racial features among the borrowers, forming two groups (black and white). Once a set of racial features are assigned to a borrower, they are fixed for the rest of the game. Business owners identify themselves racially based on their racial features and decide whether to disclose such information at zero marginal costs. The regulator's primary role is to minimize market failures, which arise from the lenders' arbitrary preference for a type of borrowers (whites) affecting lending contracts (e.g., loan amounts, interest rates, and term of loans).

The regulator can coerce the desired behavior, such as a fair and equitable distribution of funds across racial groups, by setting and enforcing clear penalties against lenders - who are also responsible for gathering information on the type of borrowers. An important takeaway from this game is that when the regulator sets zero or low penalties, lenders do not collect racial information or encourage borrowers to provide such information. Additionally, given the known bias in lending from past lending behavior and lack of a high penalty (or reassurance) by the regulator, black borrowers do not disclose their racial information. At the same time, white borrowers opt to conceal their racial information for fear it would be used for equity purposes (to help black borrowers) that could hurt them. Hence, not disclosing a player's racial information is the dominant strategy in the game.

Consequently, the equilibrium in this game mimics a prisoners' dilemma in which both types of players do not collaborate and both conceal their racial identity. This equilibrium outcome suggests for the regulator to achieve the desired behavior of a fair and equitable distribution of PPP funds, the penalty needs to be significantly high to the point of almost requiring that racial information be collected by lenders and reported by all borrowers.

II. Payoff of Concealing Race in PPP Loans

To examine whether concealing racial information in small business loans pays off, we use the PPP loans disbursed to businesses in Durham, NC. According to the SBA, the city of Durham received a total of 4,582 PPP loans that were disbursed by the end of February 2021, with an average loan amount of $107,609 and a mean firm size of twelve reported employees per loan (Table 1).[4] Consistent with (Atkins, Cook and Seamans, 2021)'s discovery at the national level and our conceptual framework,

[3]In this paper, we focus on black and white borrowers using the first batch of randomly selected PPP borrowers that we were able to match to a racial-ethnic group. See Garcia et al. (2021) for results using the full sample and additional details.

[4]See Table 1 for additional summary statistics of our PPP sample and the variables of interest used in the analysis.

close to 90% of the borrowers failed to report their race in our PPP data.

Our unit-variate analysis in Table 1 provides initial evidence that PPP had unintended consequences in the distribution of funds between those owners who self-reported race information and those who concealed it – displaying a funding gap of approximately $35,000 in favor of those who did not disclose their race regardless of their actual racial self-classification (Table 1). When analyzing black and white borrowers separately (Table 2), we find that black business owners that did not report their race received approximately $26,000 more in funding, representing 101 percent more than self-reported black business owners. Similarly, we find that white business owners who concealed their race received approximately $46,400 more in funding, representing 45 percent more in funding relative to self-reported white business owners.

Given the evidence above, does it pay off for business owners to conceal their race? We implement an econometric design to compare the average treatment effect of not reporting race within the same racial group to answer this question. We find that black business owners that self-reported their race received 52 percent less in PPP loan amount when controlling for self-selection (using the inverse Mills ratio),[5] loan-level characteristics, local demographics, and zip code, industry, lender, and month-year fixed effects (Table 3).[6]

Interestingly, when we conduct a similar analysis for white business owners, we find a 9.8 percent funding gap benefiting white business owners that did not self-report. However, the effect is not statistically significant. These findings are consistent with the expected equilibrium of the game-theoretic race-reporting dilemma.

III. Conclusion

In this paper, we discuss evidence that self-reporting race hurts individuals when stakes are high. Using hand-collected racial information of business owners, we document that individuals from the same racial group who concealed their race in PPP loan applications received higher loan amounts. The effects are larger and statistically significant among black business owners.

[5]For comparison and consistency purposes, we used the inverse Mills ratio as in Atkins, Cook and Seamans (2021)

[6]See Table 3's notes for list of control variables.

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TABLE 1—SUMMARY STATISTICS: PPP LOANS DISBURSED IN DURHAM, NC (APRIL 2020 - FEBRUARY 2021).

	All PPP Loans		Race Answered		Race Unanswered		Difference
	mean	sd	mean	sd	mean	sd	b
Loan Amounts	107609.49	363665.48	76668.29	187267.21	111280.74	379035.51	-34612.44***
Jobs Reported	11.97	29.58	10.40	20.60	12.15	30.46	-1.76
Race Unanswered	0.89	0.31	0.00	0.00	1.00	0.00	-1.00
White Owner	0.06	0.23	0.54	0.50	0.00	0.00	0.54***
Black Owner	0.03	0.17	0.27	0.44	0.00	0.00	0.27***
Hispanic Owner	0.01	0.09	0.03	0.18	0.01	0.08	0.03**
Asian Owner	0.02	0.14	0.18	0.39	0.00	0.00	0.18***
Native American Owner	0.00	0.04	0.01	0.11	0.00	0.00	0.01*
Veteran Unanswered	0.83	0.38	0.26	0.44	0.89	0.31	-0.64***
Veteran Owner	0.01	0.11	0.07	0.25	0.01	0.08	0.06***
Gender Unanswered	0.79	0.40	0.15	0.36	0.87	0.34	-0.72***
Male Owner	0.14	0.34	0.51	0.50	0.09	0.29	0.42***
Female Owner	0.07	0.26	0.34	0.47	0.04	0.19	0.30***
Corporation	0.41	0.49	0.35	0.48	0.42	0.49	-0.07**
Median Age (Zip Code)	34.43	2.94	34.50	2.83	34.42	2.95	0.07
Female % (Zip Code)	52.61	0.98	52.67	0.88	52.60	0.99	0.07
Median Income (Zip Code)	60027.59	17537.74	60108.30	17052.01	60017.96	17596.85	90.35
Bachelor or Higher % (Zip Code)	48.86	10.42	48.79	10.75	48.87	10.38	-0.08
Observations	4582		486		4096		4582

Note: This table reports the summary statistics for Paycheck Protection Program (PPP) approved and disbursed loans in Durham, North Carolina, from April 2021 to February 2021. The table includes all loans and the sub-samples for those with the race question answered and unanswered.

TABLE 2—SUMMARY STATISTICS: IDENTIFIED RACIAL GROUP AND SELF-REPORTING IN PPP LOANS

	Black Business Owners			White Business Owners		
	Answered	Unanswered	Difference	Answered	Unanswered	Difference
	mean	mean	b	mean	mean	b
Loan Amounts	25597.58	51548.74	-25951.16*	103300.32	149688.60	-46388.28*
Jobs Reported	5.31	8.52	-3.21*	12.72	13.33	-0.60
Loan Amount/Jobs	7753.88	7897.18	-143.30	9823.29	10436.87	-613.58
Veteran Owner	0.05	0.00	0.04*	0.09	0.01	0.08***
Female Owner	0.44	0.06	0.37***	0.30	0.04	0.26***
Corporation	0.18	0.30	-0.11**	0.37	0.45	-0.08*
Observations	131	297	428	261	1384	1645

Note: This table reports the summary statistics for the Paycheck Protection Program (PPP) approved and disbursed loans in Durham, North Carolina, from April 2021 to February 2021. The data is broken down by the identified racial group (black or white) and self-reporting of race in PPP loans (race question answered or unanswered).

TABLE 3—CAPTION FOR TABLE ABOVE.

	Black Business Owners			White Business Owners		
	(1)	(2)	(3)	(4)	(5)	(6)
Race Unanswered	0.657***	0.588***	0.521***	-0.013	0.075	0.098
	(0.086)	(0.124)	(0.110)	(0.142)	(0.121)	(0.104)
Self-Selection Correction	Yes	Yes	Yes	Yes	Yes	Yes
Loan Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Variables	Yes	Yes	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	No	Yes	Yes	No	Yes	Yes
Month-Year FE	No	No	Yes	No	No	Yes
Observations	399	399	399	1477	1477	1477
Adjusted R^2	0.351	0.415	0.417	0.410	0.476	0.491

Note: This table reports the within-racial-group average treatment effect of reporting race in PPP. *Race Unanswered* is a dummy equal to one if the business owner did not answer the race question and zero otherwise. *Self-Selection Correction* is the inverse Mills ratio. *Loan Characteristics* include jobs reported and dummies for females, veterans, and corporations. *Demographic Variables* include the median age, median income, and percentage of the population with a bachelor or higher for the given zip code.